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ABSTRACT

The organization, functions, and work of the Research Institute of Physical Culture and Health, and the Research Unit for Sport and Physical Fitness, both functioning at the premises of the Foundation of Physical Culture and Health in Jyvaskyla, Finland, are discussed. Research papers which have been presented at international congresses during 1978 are included to show the focuses of different research projects being conducted at the Foundation. The publication closes with abstracts of the reports published in the Institute's publication series. (JD)

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OF PHYSICAL CULTURE AND HEALTH
&
RESEARCH UNIT
FOR SPORT AND PHYSICAL FITNESS
Jyväskylä Finland

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FOREWORD

The purpose of this publication is to throw light on the research work of the Research Institute of Physical Culture and Health and the Research Unit for Sport and Physical Fitness, both functioning at the premises of the Foundation of Physical Culture and Health in Jyväskylä, Finland.
The organization and functions will first be briefly discussed. Then research papers, which have been presented at international congresses during 1979, are given to represent different research projects going on.
The publication is closed with abstracts on the reports published in the Institute's publication series.

Majority of the Institute's and the Research Unit's studies have been published only in Finnish, which means that the present report represents only a part of the projects' publications and documents. Because, however, it lends an overall picture of the research activities, we have ground for calling it the Third Year Book. The two previous ones cover international congress papers from the years of 1977 and 1978.

We wish to thank all the contributors for our joint effort. Special thanks to Mr. Sauli Takala, M.A., Institute for Educational Research, who has been our guest translator for the present and previous yearbooks.

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Pauli Vuolle & Markku Vainikka

SCIENTIFIC WORK IN THE FOUNDATION FOR PROMOTION OF PHYSICAL CULTURE AND HEALTH

The purpose of the Foundation is to promote physical culture and public health in Finland and to support scientific research in these areas. There are two research units in the Foundation: the Research Institute of Physical Culture and Health, established in 1970, and the Research Unit for Sport and Physical Fitness, established in 1975.

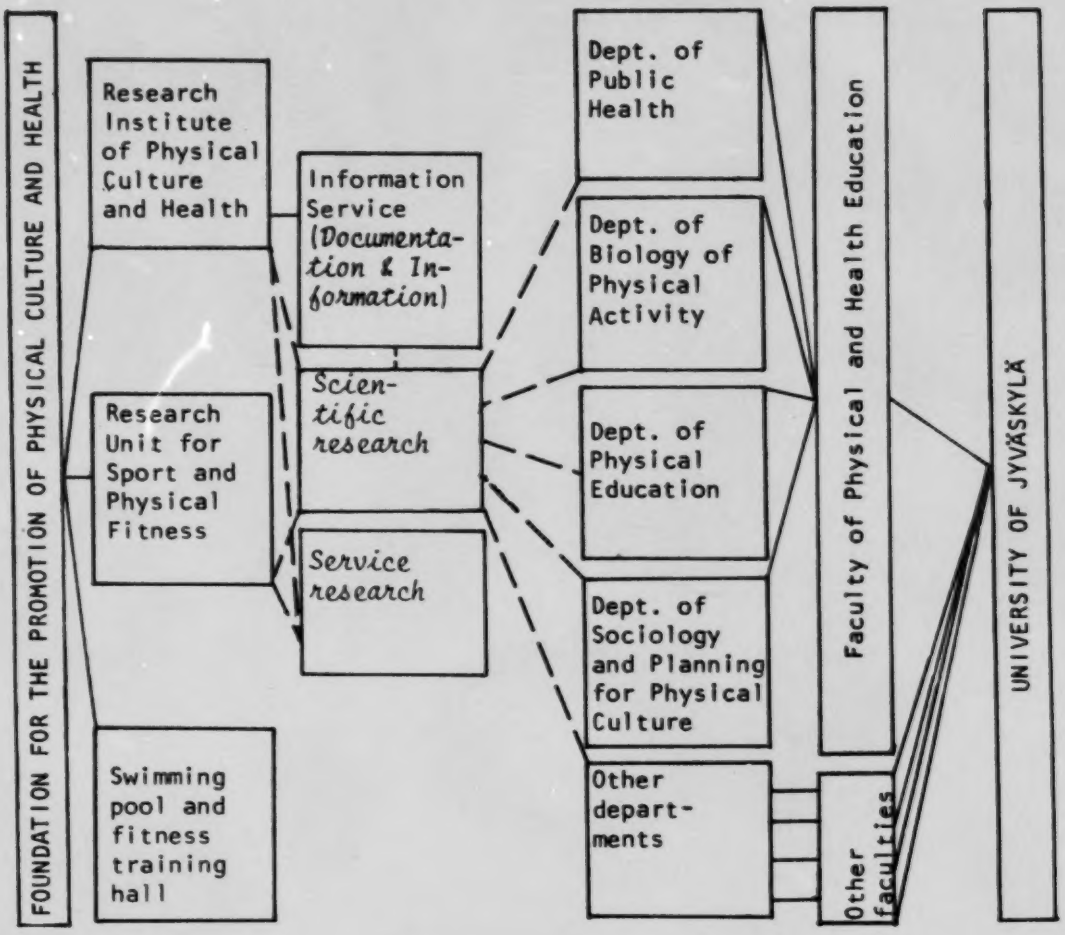
The aim of the Institute is to produce, acquire and pass on information connected with the health and welfare of man. In order to implement these aims work at the Institute has progressed along three fronts: research proper, service work and information service (Figure 1).

The aim of the Unit is to produce, acquire and pass on information connected with physical fitness, physical capability and sports. The working fronts of the Unit are the same as those at the Institute (Figure 1).

Research in both units is carried out in close collaboration with each other and the departments at the Faculty of Physical and Health Education and some other departments at the University of Jyväskylä (Figure 1).

The work of the Research Institute and the Research Unit is financed by the Ministry of Education with the exception of service research. The research has been done on the premises of the town Jyväskylä mainly and, to some extent, on those of the Faculty of Physical and Health Education at the University of Jyväskylä. The Information Service operates from the Jyväskylä University Library. In the year 1979, there have been two people employed full time in the Information Service, and six researchers and several assisting personnel engaged in research with various capacities.

Official and formal research cooperation, associates,and bodies with financial grants will be indicated within the introductions for each research project in the present yearbook.


FOUNDATION FOR THE PROMOTION OF PHYSICAL CULTURE AND HEALTH
Research Institute of Physical Culture and Health
Research Unit for Sport and Physical Fitness
Swimming pool and fitness training hall
Information Service (Documentation & Information)
Scientific research
Service research
Dept. of Public Health
Dept. of Biology of Physical Activity
Dept. of Physical Education
Dept. of Sociology and Planning for Physical Culture
Other departments
Faculty of Physical and Health Education
Other faculties
UNIVERSITY OF JYVÄSKYLÄ

——— = administrative relation
--------- = functional relation

FIGURE 1. Organization of the Research Institute of Physical Culture and Health and the Research Unit for Sport and Physical Fitness and collaboration with the University of Jyväskylä.

The Research Institute is concerned on the study of physical activity motivation for sports among young and adult people and on the other hand on the problem areas of physical education and socialization. There are three main research projects going on: 1) research on physical education of preschool children, 2) research on school physical education, 3) research on the Finnish population's sports behavior. In addition, there are three other large research projects, i.e. 4) socialization into sport involvement (an international study), 5) Health Survey 78 including a follow-up of the Institute's earlier METELI project (working conditions, state of health and physical activity in the machine industry), and 6) research on physical activity of special groups (currently the handicapped). The research project on the population's sports behavior includes currently also studies on the effects of mass communication and various motivating means on physical activity interest in different population groups.

Althoug the closest efforts in cooperative research are conducted with the University of Jyväskylä, there are important links with other research projects or research interests. This kind of activity is often informal, because it is not conjoined on financial or personnel basis. It mostly appears as informal, consulting activity between researchers. For instance, there is consulting activity with the project on preschool physical education of the Research Institute and a project on children's physical activity in the city Turku. Planning interests appear in the joint purposes of the project on school physical education of the Research Institute and a state and specialist body on research for school physical education. The project on socialization into sport involvement is carried out within the frame of the project of Leisure Role Socialization. The METELI project was originally conducted in the Research Institute in 1973 -1978 concerning working conditions, state of health and physical activity of employees in three metal plants. It's follow-up is now included in the Health Survey 78, the center of which has moved to the University of Tampere with the Research Institute conducting a special section of the follow-up in close collaboration. The researchers of the Institute can also take part in projects for which the Institute is not officially affiliated with or allocated for by any body. This is the case with a large, nation-wide project Juvenile Health Habit Study, from which there appears one congress paper in the present yearbook.

Service research at the Institute has chiefly comprised the making of investigations and plans for the use of various bodies and has been financed by the client. The service research department has made e.g. a functional plan for a sports college, a plan for school sports facilities, and sports plan for a town with the associated investigation.

The Information Service of the Institute is responsible and takes charge of information service in physical education and sports sciences under the concern of Ministry of Education. In Finland, information is collected, selected, documented and relayed of foreign and Finnish publications and, respectively, to foreign countries of Finnish publications. Information is mainly disseminated as reference lists, some times as abstracts, and often as literature reviews in Finnish periodicals. Information is selected and disseminated on the basis of scientific main areas priorized by a state body.

The Information Service works in close cooperation with the Jyväskylä University Library, the national central library for sports sciences among its other tasks. Documentation & Information work is connected with all research bodies through scientific research.

The scientific work of the Research Unit for Sport and Physical Fitness is concentrated on studying a) the physical fitness of people in working age, b) the physical performance capacity of elite athletes, and c) the connections between physical fitness and the state of health. The main projects of the Unit are at present: 1) follow-up study on the physical performance capacity of young men before, during and two years after conscription, 2) follow-up study on the effects of one-year pause gymnastics on physical fitness and school alertness of 13- to 18-year-old pupils, and 3) study on the physical performance characteristics of the Finnish national ice-hockey team. In cooperation with the Department of Biology of Physical Activity, University of Jyväskylä, the Unit conducts 4) follow-up study on endurance characteristics and exercise of Finnish elite skiers, and, further, with the Rehabilitation and Motion Centre Peurunka, the Unit carries out 5) follow-up study of physical rehabilitation of spinal cord injuried men with respect to their physical performance capacity and their social rehabilitation.

The Research Unit executes measurements of physical fitness/performance capacity and laboratory tests for athletes and fitness-sportsmen as charged survice study. Policlinical services are given for athletes to a small extent.

Research work and communication in the Foundation for Promotion of Physical Culture and Health is structured on the basis of the present situation also in the near future. The activities as a whole will be guided by a state research programme for research in sports sciences and physical education, which is a five-year programme for the beginning decade.

1. RESEARCH PROJECT ON PRESCHOOL PHYSICAL EDUCATION

The research project on preschool education was started in 1973 and it will for the most part come to the end in 1980. Its main objective has been to create scientific basis for the development of preschool physical education in Finland and especially within the daycare system. The project is closely connected with development of early education, which has been taking place in Finland in the 1970's. The Act on children's daycare was passed in 1973. Ever since the system of children's daily care and the training of daycare personnel have increased. More attention is paid to the development of teaching contents, e.g. in the field of physical education, within preschool on a national level.

The research project on preschool physical education is by nature multi-scientific. It emphasizes among others developmental psychological and early pedagogical knowledge. The project includes three extensive phases of research. The first wide problem area deals with the development of measuring and evaluation methods in children's development. In the pilot studies, carried out during the early stages, measuring methods for motoric development and motoric basic readinesses were developed. The development has started with children in the ages of 6-7 years and later with 1-6 year-olds as well. The development of measuring methods was preceded by an extensive theoretical analysis of preschool children's motoric and personality development. Furthermore the project has included the development of measuring methods of preschool children's physical activity. The methods included e.g. the use of pedometer, interviews and teacher ratings. The methods have been tried out in pilot studies, which have revealed empirical data on 1-7 year-old Finnish children.

In 1976 the project acquired a new research methodology, which could be called the action research type of study. It includes cooperation with preschool personnel as regards the contents and forms of preschool physical education.

The last phase of the project will include the writing of a pedagogical handbook on preschool physical education in collaboration with researchers and persons responsible for the training of kindergarten teachers. The contents of the handbook will be grouped according to age-group prerequisites (over and under 3 years of age).

The research project on preschool physical education has been carried out in close collaboration with the Department of Psychology, University of Jyväskylä.

In 1979 the research process has focussed on the motor habits and readinesses of the children who have already started their comprehensive school.

Helena Siren-Tiusanen

THE MOTOR DEVELOPMENT AND THE FORMATION OF ASPECTS OF PHYSICALLY ACTIVE WAY OF LIFE IN PRESCHOOL CHILDHOOD IN THE PRIMARY SOCIALIZATION INSTITUTIONS

International Congress in Physical Education, "The Skillfulness in Movement: Theory and Application",
Québec, Canada, 26.-30.6.1979

1. BACKGROUND

In modern society, which is becoming increasingly urbanized and is undergoing rapid change due to scientific and technological development, it is not at all self-evident that children would move spontaneously quantitatively and qualitatively sufficiently even in early childhood. Children's spontaneous motor activity is restricted by several environmentaland educational factors: these include the smallness of apartments, day care centres and yards, the dangerous trafic in the neighbourhood and poor environmental planning etc. (Schilling 1975, Siren-Tiusanen 1978a). Similarly the abundant supply of superficial stimuli and daily TV-viewing may make children passive.

In this period of intensive physical, psychic and social development it would, however, be important that children, irrespective of their living environments, would have a chance of sufficient daily motor ability and of manysided physically active play in early childhood (Siren-Tiusanen & Välimäki 1979). In key positions are here agencies of primary socialization : for example home, day care and clubs and their educative activities.

Since the Act on Children's Day Care came in Finland into force in 1973 the day care system has acquired added importance as the supporter and supplementer of home education. Its educational objectives and contents are being deliberated in a state committee. A topical question in this context is making the development of physical education a more inherent and richer part of the functioning of the day care system.

2. AIMS AND PROBLEMS OF THE PROJECT

Since autumn 1973 a project on physical education in early childhood (children aged 0 to 7) has been in progress at the Research Institute of Physical Culture and Health in Jyväskylä. Its main aim has been to support the physical education activities of the primary socialization institutions in Finland and to give them a scientific foundation. The starting point of the project is multi-disciplinary: it has attempted to draw on knowledge of early childhood available in physical education, developmental psychology, early education and children's anatomy and physiology. It has also been considered important that the project should build on our own national traditions of physical education and culture (eg. the traditions of physical education in Finnish kindergartens) and be of humanistic nature.

The main problems of the project have been to define

1. what forms of motor activity and physically active play should be supported and developed on different age and developmental levels in early childhood,
2. what forms of guidance methods should be used so that due attention is given to the conditions of children's overall development,
3. what are the main objectives of the overall physical education in early childhood.

One of the basic starting points has been to foster children's motor development in an age-appropriate and manysided way, to create a positive emotional foundation for a physically active way of life and to secure children's opportunities of self-initiated activity as well as pedagogical guidance from adults. It is necessary both to guarantee children's daily need of physical activity and to take into account their longer-term developmental needs in primary socialization institutions.

3. METHODOLOGY

Methodologically the project can be classified as action research type of study. The project forms an integrated whole consisting of theoretical work, empirical data collection and pedagogical experiments in day care centres. An essential part of the research process has been a close and intensive collaboration with the personnel active in the area of early education, particularly kindergarten teachers and persons responsible for their training in the field of physical education.

The project has also evaluated children's basic motor readinesses as well as the amount and types of their physical activity by using a variety of methods (motor tests, observation, pedometer, teacher ratings, interviews) (Nurmi & Siren 1975, Siren-Tiusanen 1978a).

The results concerning them fall outside the scope of this paper, however. Only some aspects of the results obtained so far in the project will be dealt.

4. THE FORMATION OF ASPECTS OF PHYSICALLY ACTIVE WAY OF LIFE IN EARLY CHILDHOOD IN PRIMARILY SOCIALIZATION INSTITUTIONS

4.1. The frame of reference of motor development as a guide of pedagogical activity

The motor development in childhood consists of stages that are sensitive to different environmental stimuli. They are associated to the anatomical and physiological conditions of child development and to the stages of children's psycho-social development (Hirtz 1978, Israel 1976, Winter 1975). At these stages children are interested in practising motor activities that are maturing and developing (Lisina & Neverovich 1971, Piaget 1962, Siren-Tiusanen 1978b). Through pedagogical means children should be given opportunities of doing so and provided with environmental stimuli if they are not sufficiently well available in children's immediate environments. The younger the child is the more he needs practice to make motor activity into automatic readiness.

Stages that are sensitive to environmental stimuli are described in more detail in Table 1.

The best known of the processes of motor development in early childhood is the development of basic motor readinesses described in the above. In addition to it the development of so-called coordination abilities of the neuro-muscular system is of great importance. It includes the control of the whole body, the fine motorics of the hand, rhytmic ability, reaction ability and kinaestetic discrimination ability (Lohmann 1978). The development of motor condition abilities in early childhood has to date been studied quite sporadically. Children's organism is biologically ready for the development of motor coordination earlier than of motor condition (Israel 1976). In physical education we must, however, start from the developmental interaction of the two aspects.

4.2. Consideration of psycho-social development and dominant developmental activities in upbringing children's motor activity

For the guidance of children's movement and motor activities it is important to know their dominant activities and the characteristics of their psycho-social development at each age and developmental level. These are determined by children's anatomical and physiological development as well as their upbringing and their living environment.

Table 2 describes the dominant activities and characteristics of psycho-social development that should be taken into consideration at different age and developmental levels, when by means of organizing the environment and through pedagogical guidance we seek to upbring their motor activities and to build an emotional foundation for a lifelong interest in physical activity (Poddyakov 1975; Repina 1971; Siren-Tiusanen et al. 1979).

Table 3 summarizes ways of supporting and expanding children's motor activities at different age and developmental levels by means of children (Siren-Tiusanen et al. 1979).

TABLE 1. Main stages of motor development in early childhood (Winter 1975; Siren-Tiusanen 1978a).

Age/Developmental level	Unvoluntary		
Birth - 2/3 mo.	Mass movements: Mass movement of hands and of legs, which take place reciprocally and simultaneously in all large joints of the body		
2/3 mo. - 1 yr/1 yr 2 mo.	First coordinated movements: Development of fine motor grasp	Development of upright posture	Development of independent locomotion. E.G. crawling, creeping, walking
1 yr/1 yr 2 mo. - 3 yrs/3 yrs 6 mo.	Acquisition of a variety of basic forms of motor activity: rolling somersault pushing pulling hanging swinging	climbing going up and down steps balancing running jumping skipping	carrying throwing "shock throw" with both hands onehanded overhand throw throw at target catching against body at chest height
3 yrs/3 yrs 6 mo. - 7 yrs/7 yrs 6 mo.	Rapid automatization of a variety of basic forms of motor activity and learning the first combinations of them: Performance genesis: upgrading of quantitative level of performance		Form genesis: qualitative improvement of performance, more flexible transfer of skills to new situations and tasks, simultaneous or successive combination of movements and readinesses
7 yrs/7 yrs 6 mo. - 9/10 yrs	Rapid development of motor learning		

TABLE 2. Central characteristics of phycho-social development and dominant activities at different age and developmental levels in early childhood.

0-1 yr

- Immediate emotional communication with parents or adult caretakers as dominant activity; sensomotor activities start developing.

1-2 yrs

- Great need of physical activity combined with unstable attention. Environmental stimuli and sensations stimulate motor activities.
- Emotions and affects dominate behavior; emotional state changes rapidly. Verbal voluntary control of one's own behavior is weak.
- Central forms of learning are imitation of adult and other children's activities as well as spontaneous exploratory behavior, manipulation and repetition of acts.
- Children's play is functional: they are learning various uses of objects and tools and imitate the activities of people around them. Independent play readinesses are formed.
- Learning of independent adaptive activities (such as eating, getting dressed and undressing) is central.

2-3 yrs

- Need of physical activity is still great, emotions and affects dominate behavior.
- Imitation and exploratory activity are the most important forms of learning.
- Verbal, voluntary control of behavior increases: children increasingly obey simple verbal instructions and signs.
- First mental images are formed, eg. mental images of the movements of familiar animals.
- Children understand a short fairytale or the plot of the story.
- Play is still functional solitary or parallel play; independent play readinesses increase.
- Children are particularly interested in the activities of same-aged children and want to play the same game as the other children.

4-5 yrs

- System of voluntary, creative imagination is formed; mental images begin to direct learning, voluntary control of behavior develops.
- Thinking is pre-conceptual, image-based.
- Role play together with other children is the dominant form of activity.
- Children exhibit verbal creativity, they like rhymes etc.

6-7 yrs

- Organized rule play in group emerges as the dominant form of play.
- Learning motivation is strengthened, interest in preschool and learning tasks increases.
- Ability to learn on the basis of verbal instructions improves.
- More critical attitude towards imagination and mental images develops.

TABLE 3. Organization of environment and educational activities supporting the formation of motor activities and habits.

0-1 yr

- guaranteeing sufficient space for movement
- stimulation of movement by means of toys and objects, etc.
- movement combined with caretaking
- joint play of adult and baby

1-2 yrs

- Organizing surrounding environment and indirect guidance: guaranteeing sufficient space for movement indoors, sufficient periods of being outdoors, toys that stimulate movement (eg. toys that are pushed or pulled).
- Organization of concrete activity situations in accordance with children's interests (eg. opportunity of balancing experiments, stepping over etc.)
- Simple movement games using objects and equipment and/or imitating adult movements: running games, creeping and climbing games, ball games, rhythm games etc. (also possible in small groups of 3-4 children).

2-3 yrs

In addition to the tasks intended for 1-2 -year-olds:

- Guided movement games and systematically progressing learning activity periods in small groups. Contents: walking and balancing, running, jumping and skipping, throwing, rolling and ball games, climbing and creeping, rhythm games, movement to accompany rhymes and music, coordinated movements based on imagination: cats are creeping, worms are crawling, etc.

4-6 yrs

- Ensuring sufficient movement daily.
- More systematic movement education is provided to children by organizing movement activity periods each week.

  They can be built on the following contents:

  1. Movement games: (a) games in order to get to know the yard and the immediate neighbourhood, (b) running and reaction games, (c) jumping and skipping games, (d) throwing and catching games.
  2. Stabilization of basic motor readinesses: (a) walking, running, balancing, (b) jumping, (c) throwing and catching.
  3. Gymnastic movements stimulated by fantasy images, apparatus etc. (a) back and shoulders, (b) stomach muscles, (c) arm movements and stretching, (d) leg movements.
  4. Creative movement and movement accompanying music: (a) sensory training, (b) training to get to know one's body, (c) improvisation and improvisation in group, (d) concentration and relaxation exercises, (e) song games, ring games and folk dancing.
  5. Skiing, skating, and swimming at appropriate times of the year.

4.3. Special requirements set on the planning and realization of guided movement education and motor activities in early childhood

1. Creating emotional atmosphere and positive emotions. Of particular importance are the educator's inspiring behavior and vocal manner, among children below 3 years (at the age of functional play) the use of equipment and apparatus directing their interest and aiding concentration, as well as combining movement with music, rhymes and vocalization. Among children above 3 years imaginative stimuli are important for creating a positive atmosphere: eg. a fairytale can make movement meaningful for children. Emotionality can also be created by plays, games, rhythmical poems, rhymes, music and group improvisation.

2. High degree of concreteness combined with verbal guidance. Among groups consisting of children under the age of 3 the educator moves and plays actively as a model, which children can actively imitate. At this age children's learning is dominated by sensory processes. The educator or one of the children demonstrates new movements. This is supplemented by the use of apparatus and equipment, short verbal guidance, signs and helping individual children by showing what they are to do and how. Children's spontaneous activity should always be in the foreground. Use is made of familiar mental images of how animals etc. move. With children at the kindergarten age verbal guidance is increased although children still learn complex movement patterns by imitation. At kindergarten age concreteness and clear mental images can be achieved eg. by looking at pictures, using hand puppets, drawing on children's mental images of their environment, demonstrating movements (either by some child or the educator) and by using apparatus and equipment. By means of language children can be guided to attain a more exact and detailed mental image of the movement in question: "little foals skipped around so lightly that no sound was heard".

3. When we approach school age it is important to see to it that learning activity periods make sufficient appeal to children's cognitive functions: memory, inventiveness, thinking and other voluntary mental effort, desire for adventure and wish to overcome difficulties. In movement based on fairytales and imagination children are becoming increasingly critical of images mediated in them: they may not want to move in accordance

with a "childish" story but a cosmic trip may well motivate them as the topic of movement period. Children approaching school age more and more often begin to demand "real" gymnastics, sport and games.

4. It is important to use movements which are appropriate to the age and developmental level of children and can thus be mastered by them.

5. Movement periods should be made varied and manysided so that both sides of the body and all large muscle groups get sufficient exercise. In the case of younger children global movement patterns are used to a large extent: creeping etc.

6. Cooperation and social activities are used frequently. Groupings among 2-3 -year-olds are simple: all move as a front, in line, in circle or in pair hand in hand. Later on grouping patterns become more varied.

7. Variety is created by moving about a lot, but also by doing things staying on the same spot, acting as a free group and as an organized group, the educator sometimes demonstrates movement and sometimes this is done by one of the children spontaneously. New movements are introduced but a lot of attention is given to the consolidation of old movement patterns. Rest and exercise are distributed in accordance with children's physiological needs.

8. The learning activity period usually proceeds in the following way:
   a) warming up: arousing interest and satisfaction of immediate need of movement
   b) learning of new movements and/or consolidation of old subject matter winding up
   c) winding up of period: final game or some other emotional climax, relaxation and summing-up discussion
   d) tidying up, putting away of equipment, washing.

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2. RESEARCH PROJECT ON SCHOOL PHYSICAL EDUCATION

In 1974 there started in Finland a public discussion about physical education, particularly school physical education, about its significance and its need of knowledge. The president expressed his concern about the state of physical education and the Minister of Education supported the intensification of research on school physical education.

The Research Institute of Physical Culture and Health iniatiated in 1974 systematic research on school physical education with a view to contributing to its development by means of research. An Advisory Council for Research on School Physical Education was set up to direct and supervise research activities. The members of the council represent the National Board of Education, The Finnish Association of Physical Education Teachers, the University of Jyväskylä and the Research Institute of Physical Culture and Health.

The Advisory Council decided that research activities should be started by preparing a general plan for a programme of research on school physical education covering the years from 1975 through 1979. The purpose of the policy programme is to indentify the most important and urgent research topics in the field of school physical education and to help focus limited research resources on the study of the specified problems.

For the implementation of the above-mentioned policy programme the Research Institute of Physical Culture and Health, in collaboration with the Department of Physical Education, University of Jyväskylä, in 1975 started a research project on school physical education, which aims at developing the physical education curriculum of the comprehensive school and at promoting its realization, giving special attention to the clarification of objectives, to the significance of teaching contents and to the development of evaluation methods. The project consists of three subprojects.

In the subproject on pupils' physical fitness a large survey of comprehensive and secondary school pupils' physical fitness has been carried out using an international fitness test as the measuring instruments. The sample concists of 2796 boys and girls from grades 3-9 of the comprehensive school and from grades 1-7 of the secondary school from 20 communities and 54 schools. The essential purpose of the study is: 1) to produce a standardized (international) physical fitness test for use in Finnish schools, which also includes a manual and norms, 2) to study how pupils' fitness varies according to teaching contents, teaching circumstances, home background, place of residence and other related factors, 3) to develop a system for the monitoring and follow-up of pupils' physical fitness for the purpose of follow-up at the level of the whole educational system.

The study of pupils' interest in physical activity has first concentrated on the theoretical background of interest and motivation for physical activity and development methods for the measurement of interest and motivation. It has been carried out a survey of physical activity interests similar to the one made in the fitness subproject. The main problem of the project on pupils' physical interests is how it is formed during school age and what is the contribution of teaching contents, teaching methods and circumstances and some other environmental factors to the development of interest in physical activity. Also the interest project aspires to develop instruments for measuring interest and motivation in schools. Similarly it is planned to create a school system level system for the follow-up of pupils' interest and motivation for physical activity.

A third subproject has started in the autumn of 1977, whose purpose is to study structure of motor skills, to indentify the most important basic capabilities for the curriculum, to develop instruments for measuring basic skills in schools, and as the main task to study the significance of motor skills from the point of view of the realization of the fitness and interest objectives of school physical education.

Risto Telama & Heimo Nupponen

THE PEDAGOGICAL SIGNIFICANCE OF THE CONTENTS OF PHYSICAL EDUCATION

International Conference on Physical Training and Sport, AIESEP, Split, Yugoslavia, 25.-30.9.1979

1. INTRODUCTION

This paper results from research carried out under the auspices of the Research Programme on Physical Education in Schools launched in 1975.[1)] The purpose of the present paper is to elucidate the pedagogical significance of the contents of physical education by means of theoretical analysis and empirical data.

One of the basic problems in the preparation and implementation of a curriculum is the operationalization of goals. This has traditionally been carried out by means of the curriculum content by emphasizing the importance of the contents in curricula (Decker 1977, Koskenniemi 1976). With reference to the determiners of the curriculum we can distinquish content-based curricula (Lahdes 1973, Malinen 1977).

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1) The Research Programme on Physical Education in Schools is an extensive research programme which is being carried out by the Research Institute of Physical Culture and Health and the Department of Physical Education at the University of Jyväskylä and sponsored by the Ministry of Education. The director of the programme is Dr. Risto Telama; full-time researchers have been Heimo Nupponen, M.Sc., and Martti Silvennoinen, Lic.Phys.Ed. The preparation of this paper was also assisted by Liisa Aarnio, Anni Drews, Marja Wennström and Maarit Ylönen.

The contents of teaching has traditionally been the core of curricula also in physical education. At least in Finland, the goals of the comprehensive-school curriculum have been operationalized mainly by means of various sports and the basic skills involved (KomM 1970:A5), and this seems to have been the situation also in many other countries (ICHPER 1969). This kind of operationalization of goals involves at least two problems: the fuzziness of the concepts of contents and type of sport, on the one hand, and the little importance of the contents for the implementation of the goals, on the other.

The concept of contents is difficult to define. First of all, it is difficult to draw a borderline between contents and goal, on the one hand, and between contents and activity form, on the other. For instance, according to Stiehler, (1973), knowledge (Stiehler makes a distinction between 'Kenntnisse' and 'Wissen') should be considered a learning experience or a goal while rules, norms, facts, ideological conceptions and values belong to contents. Secondly, type of sport is confusing as contents because it is too wide a concept being a combination of motor skills and various other elements. A good example of the complexity of one sport as contents is found, for example, in the analysis by Hecker et al. (1977). For this reason, what is needed for the development of curricula is the classification of various sports according to approaches derived from different branches of science (for attempts to do this, see Farrel 1975, Godfrey & Kephart 1969, Larson 1974, Vanek & Cratty 1970: 39 - 44).

The other problem connected with the content-based curriculum is concerned with the link between contents and goals. Whenever the goal is a concrete behaviour, such as being able to swim, there is no problem, because the contents and the goal materialize in one and the same concept. The situation is much more complex when the goal involves more abstract concepts, such as socialization. For instance, the curriculum of Finnish comprehensive schools says that team sports develop socialization (KomM 1970:A5). This brings fourth the question of whether the other sports can be used to develop socialization by making the teaching situation more social and, moreover, whether it is possible that team sports have effects that are adverse to socialization. In this context, attention can be called to the concept of simultaneous

learning developed by Kilpatrick (1925); according to him, when certain contents is being learned, several simultaneous learning processes are involved, which should be observed in the planning of teaching. That is why, attention should also be called to the method, ie. the activity form. In addition to Kilpatrick, Petersen (1950) called attention to the importance of the method rather early, and recently the importance of the method has again been recognized (Decker 1977, Koskenniemi 1976, 1977). In the spectrum of teaching styles presented by Mosston (1966, 1972) the link between goals and method has been systematized.

2. PROBLEMS

The purpose of the study reported here is

1) to describe the application of the contents of Finnish comprehensive-school curricula to teaching in relationship to the official curriculum, ie. to describe the implementation of the curriculum contents; and
2) to study the correlation between the curriculum contents and leisure-time interests of the pupils, ie. to study the importance of the contents for the second major objective of the curriculum, which is the establishment of a constant interest in physical activity and sport.

Despite the problems which are known to be connected with the use of sport as contents, the concept of contents has been operationalized in the empirical part of the research programme through types of sport. The main reason for this is the fact that the Comprehensive School Curriculum applies the same principle and the research programme has been designed to study the implementation of this curriculum.

3. METHODS

The data necessary for Problem (1) were gathered at an earlier phase of the programme (Nupponen 1979). The population consisted of all the teachers and pupils of grades 7 to 9 in the entire country and those of grades 3 to 6 in the province of Central Finland. A total of 265 classes were selected from among them by means of a multiphase stratified random sample.

For Problem (2), data was collected in which the population consisted of the 5 to 7 graders of the comprehensive school and of upper secondary school pupils, the sample totalling 2.346 pupils from 175 classes selected by a multiphase stratified random sample.

Teachers were asked information about teaching contents by means of a mailed enquiry, and pupils reported on their physical activities through a questionnaire.

4. RESULTS

4.1. Application of the teaching contents

In the physical education curriculum of the Finnish comprehensive school, the teaching contents has been divided into six categories: (1) basic physical activity, which means running, jumping, throwing, and their applications such as track and and field, (2) ball games, (3) gymnastics, (4) skiing, (5) skating, and (6) swimming (KomM 1970: A5). The results of the research programme imply that the curriculum has been observed to the effect that 90 per cent of the teaching contents is derived from the curriculum. However, considerable divergence from the curriculum was found in the relative proportions allotted to each category mentioned in the curriculum. For instance, ball games play a much more important role in the physical activities of boys than is devised in the curriculum (Table 1). Towards the higher grades the relative proportion of ball games increases and the teaching programme becomes more one-sided (Table 2). Comparison of the results with earlier ones implies that the proportion of the time used for ball games has been on the increase in the last few decades (Nupponen 1979). The same is also apparent in schoolchildren's leisure-time interests (Telama 1979).

In most cases, the number of lessons used for each category of sports correlates positively to the preferences for the corresponding categories among both teachers and pupils, but among teachers the correlations were stronger. In Finland, physical education is differentiated by sex for all pupils from grade 7, often even earlier. In the teaching contents, the most obvious sex differences are in that men teach more ball games to boys than women to girls, and female teachers spend more time on gymnastics. The difference in the varieties offered is pedagogically

TABLE 1. Means (± S.D.) and percent distribution of lesson hours of the various teaching contents (Nupponen 1979)

Teaching contents	M h		S.D. h	Percent distribution	
BALL GAMES	35.8			39.5	
basket ball		8.1	5.5		8.9
soccer		7.8	8.0		8.6
volley ball		7.6	5.9		8.4
ice hockey		6.5	6.5		7.2
finnish base ball		5.8	4.8		6.4
ACTIVITIES IN GYM.	14.8			16.3	
gymnastics		5.9	6.7		6.5
apparatus gymnastics		4.2	4.0		4.6
dances		2.5	2.7		2.8
fitness training		2.2	2.8		2.4
TRACK AND FIELD	13.1			14.5	
long distance running		5.0	3.5		5.5
jumping		3.1	2.1		3.4
throwing		2.5	1.8		2.8
sprint		2.5	1.7		2.8
SKATINGS	4.4		5.1	4.9	
ORIENTEERING	4.2		3.3	4.6	
SKIING	4.1		4.8	4.5	
SWIMMING	3.3		3.2	3.6	
MEASUREMENTS	3.4			3.7	
OTHER	7.6			8.4	
TOTAL	90.7	90.7		100.0	

TABLE 2. Percent distribution of the various teaching contents (Nupponen 1979)

BOYS	Comprehensive school						Upper secondary school	
	C[1]	5	6	7	8	9	I	II
Ball games	37	46	54	49	51	51	60	55
Activities in gym.[2]	17	14	14	13	8	7	9	10
Track and field	20	12	11	14	15	13	12	10
Skating	6	4	3	1	2	1	1	2
Orienteering	4	5	3	6	6	5	3	3
Skiing	12	7	3	6	4	3	2	2
Swimming	1	3	5	2	3	4	4	4
Measurements	2	3	3	5	4	4	5	5
Other	1	6	4	4	7	12	4	9
%	100	100	100	100	100	100	100	100
GIRLS								
Ball games	27	19	27	31	34	33	31	30
Activities in gym.[2]	28	24	27	22	19	20	27	24
Track and field	15	19	17	16	13	11	14	14
Skating	7	18	12	9	7	7	7	5
Orienteering	3	1	2	5	6	5	5	4
Skiing	11	7	3	4	3	4	4	2
Swimming	1	5	3	3	4	4	6	5
Measurements	1	2	3	4	3	3	4	4
Other	7	5	6	6	11	13	2	12
%	100	100	100	100	100	100	100	100

[1] C = combined classes

[2] Gymnastics and other activities in gym. excluding ball games

interesting: the programme applied by female teachers is more variable, and they apply the official curriculum more scrupulously than male teachers. Men spend more time than women on teaching sports that they like themselves (Nupponen 1979). The fact that female teachers are more conscientious has been noticed before; they spend more time planning their teaching and regard it as more important than men (Telama et al. 1978).

Another interesting aspect is the fact that the correlation between facilities and contents is weaker than was expected. Differently from what was expected, the importance of the space available indoors for physical activity was smaller than that of the availability of equipment and also smaller than that of the school surroundings (Nupponen 1979).

4.2. The interrelationship between teaching contents and leisure-time interests of the pupils

The correlation between the time used for teaching different kinds of sports and the participation of the pupils in the same sports during their leisure time was not very strong. The strongest and most consistent correlation was found in sports which required highly developed skills, such as apparatus gymnastics and basketball (Figure 1). For many sports the interrelationships were inconsistent to the effect that the correlations were reverse at different grades, and no explanation could be found for this. In some sports, eg. swimming, the circumstances bring about a spurious dependence relationship between teaching and leisure-time interests. It is worth remembering however that it was pointed out above that the circumstances have little effect on teaching contents. In some sports, eg. Finnish baseball (Figure 2), the correlation was found for boys, but not for girls.

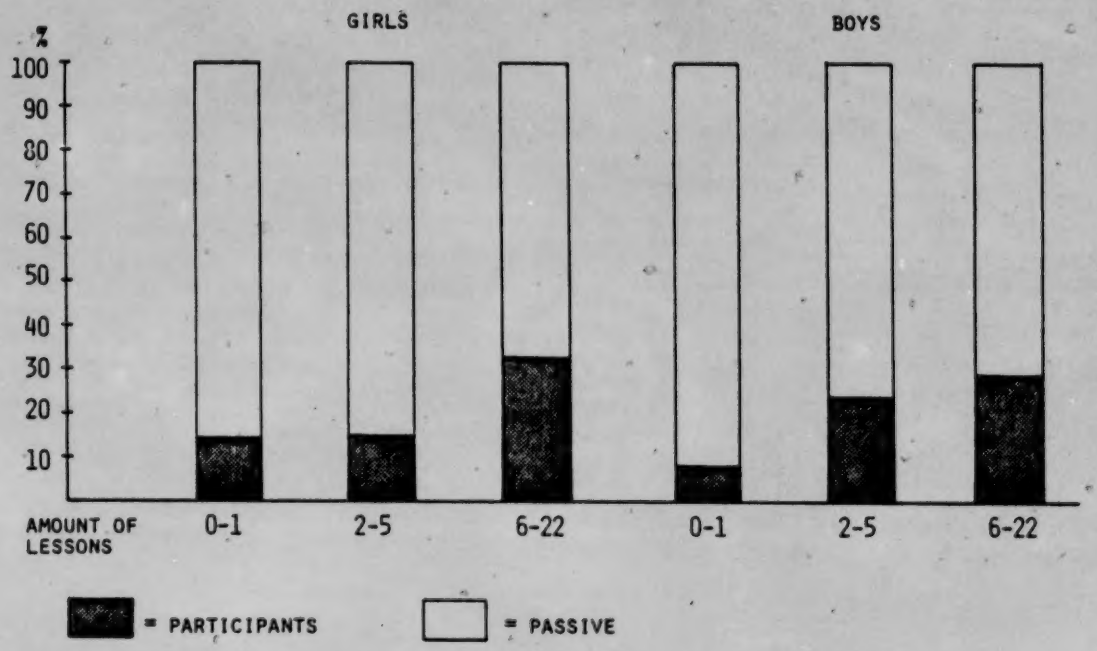

FIGURE 1. DISTRIBUTION BY SEX AND NUMBER OF LESSONS IN PERCENTAGE OF PARTICIPATION IN APPARATUS GYMNASTICS

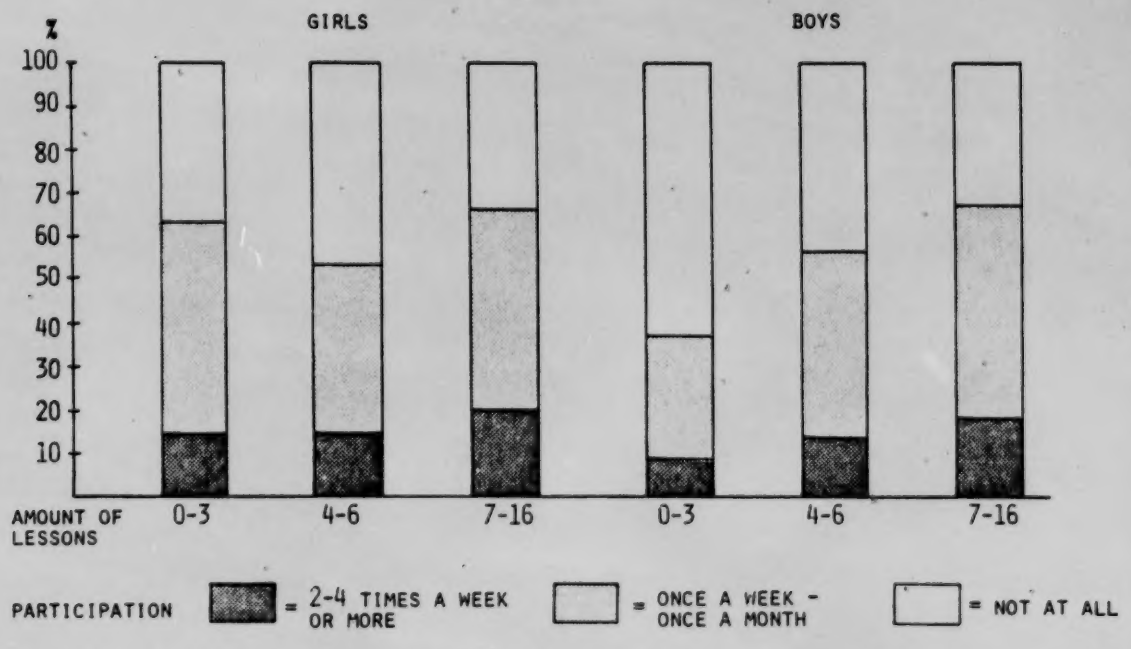

FIGURE 2. DISTRIBUTION BY SEX AND NUMBER OF LESSONS IN PERCENTAGE OF PARTICIPATION IN FINNISH BASEBALL

5. DISCUSSION

The results reported in this paper are rather trivial, and it is difficult to draw scientifically reliable conclusions from them. Firstly, a spurious correlation between teaching time and pupils' leisure interests may have been caused by environmental variables which were impossible to control in this research programme. It is true, on the other hand, that in this programme no attempt was made to make any causal conclusions about the effects of teaching. Rather, with reference to the theoretical startingpoint, an attempt was made to show that various types of sport as teaching contents are not of great importance for the objectives of teaching, ie. it has been assumed that there is no link between mere numbers of lessons and interest in physical education and sport. The fact that the correlation is strongest in sports which require more highly developed skills seems to indicate, however, that the number of hours spent on a certain sport might increase the probability of there existing some interest in the same type of sport in leisure time.

The empirical part of the research programme is somewhat trivial also for the reason that only the time used for different kinds of sport was observed. As far as the contents of teaching is concerned, it would be much more important to know what has been done during the lessons, whether, for instance, the skills involved in a sport have really been taught and, if they have, in what way. As was pointed out above, the present trivial discussion has been based on a trivial curriculum, in which an attempt has been made to operationalize the goals of teaching by means of types of sport. The results of the research programme show, however, that the importance of the contents of teaching expressed in terms of types of sport is rather small for the implementation of the goal of creating interest in physical activity and sport. In connection with the research programme, attention was also paid to the correlation between the contents of teaching and schoolchildren's physical fitness, ie. the implementation of the physical-fitness goal, and it was found out that the correlation was even weaker. Thus the empirical results underline the same conclusion as the theoretical startingpoint of the programme: More attention should be paid to the specification of the contents of teaching and activity forms in the development of the curriculum.

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Risto Telama & Martti Silvennoinen

THE MOTIVATION FOR PHYSICAL ACTIVITY IN SCHOOL AGE

International Congress "Sweducation", Physical Education and Social Development, Örebro, Sweden, 15.-21.7.1979

1. INTRODUCTION

In many countries, also in Finland, one of the most important objectives of physical education in school is the development of a constant interest in physical activity and sports. The implementation of this interest objective presupposes, among other things, that the environment offers sufficient prerequisites for physical activities, at least certain kinds of skills in physical activity and necessary facilities. An essential, and perhaps the most important, prerequisite for interest is however the motivation for physical activity and sport. Motivation is pedagogically important for the reason that it is a relatively stable quality which can be influenced by physical education at least to a certain extent. It is through the strengthening of motivation that the effects of physical education in school can be extended to adult life after school.

In addition to physical education and other environmental factors, the shaping of the motivation for physical activity in school is naturally affected also by physical, social, intellectual and other development. For the purposes of pedagogy it is interesting to study the general nature of the motivation for physical activity in school-children, the schooltime changes in this motivation, and the inter-relationship between the motives and their changes, on the one hand and participation in physical activity, on the other. This is an

interesting topic also in view of the theme of this congress.

This paper will first deal with some theoretical concepts related to the motivation for physical activity, then present some empirical results of research on the motivation for physical activity among Finnish schoolchildren, and finally present some pedagogical conclusions.

2. THE THEORETICAL BASIS OF THE MOTIVATION FOR PHYSICAL ACTIVITY AND SPORT: GENERAL CONSIDERATIONS

It would not make sense to enter here a highly theoretical discussion of the theories of motivation or of various theories which aim at explaining a human being's goaldirected behaviour. Instead, I am going to take up a few theoretical concepts which I consider important and which I have used as the basis of the description of the motivation for physical activity and sport. These central concepts are need, motive, and activity.

In western scientific literature, one of the best-known among the treatments of need is the hierarchical model developed by Maslow (1954). Maslow's model includes, among other things, the generally accepted idea that needs can be either biological or acquired. In addition, it also reminds us of the fact that 'higher' needs cannot be easily developed if the biological basic needs are not satisfied.

Recently, the nature of need has been discussed, perhaps most deeply, in the framework of the theories dealing with human activity and personality. Petrovsky (1973) defines need as a state of an individual which reflects its dependence on the concrete conditions of existence and which functions as an incentive for the activity of personality. While Maslow's model describes the nature of people's needs, this definition calls our attention, in the first place, to the processes through which the needs arise and develop on the basis of the individual's biological foundation and various interrelationships experienced by the individual in a certain social situation and culture.

When dealing with the theory of activity, Leontev (1977) presents a classification which is important for the conceptualization of need. He talks about need as an internal condition, as one of the essential prerequisites of activity, and about need as a factor directing and guiding the subject's activity. When we are dealing with the motivation for physical activity and sport, we are mainly interested in need as a factor directing activity. Only after need becomes materialized, ie. when it meets a goal which is suitable for it to become satisfied, will it be able to regulate and direct activity. In such cases, the goal will acquire a function which institutes and directs activity, it becomes a motive. For instance, a person who experiences a need for affinity - as an internal force - acquires a goal, a concrete motive, for his need by playing volleyball, and thus the need for affinity becomes a need directing behaviour and a motive. What is essential in Leontev's theory is the close interrelationship between activity and motive. The goal of activity is actually its motive.

The link between activity and motive, between activity and need, receives additional emphasis also for other reasons. It is characteristic of human activity that the direction that activity assumes is not entirely set by the need which brings it about: a conscious goal begins to direct activity which has been initiated by a certain need. This means that motive and goal are not necessarily one and the same thing. In addition, needs and motives undergo changes during activity. Physical activity may elicit needs which are entirely new and which may even supercede the needs that initiated the activity. For instance, an adult's interest in physical activity may be aroused by his concern for his health and fitness but his experience with physical activity may be an incentive even for a strong competitive motivation or for a need to develop himself. This seems to have been the case in Finland and elsewhere when as a result of the great interest in jogging people have participated in extraordinarily extented sport events and competitions. The dialectic connection between motivation and activity is also pedagogically important; this is a question which I am going to take up later.

In the trichotomic division of educational objectives into cognitive, affective, and psychomotor ones, motivation is normally included in the affective objectives. Yet cognitive factors play an important part in the motivation for physical activity. Therefore, one of the most fundamental theoretical concepts to deal with is the degree to which the goal of activity is conscious and internalized. By internalization Leontev means an activity through which an external process becomes psychic, ie. an activity in consciousness. Moreover, internalization can also be seen as a process related to the affective objectives in accordance with the taxonomy of affective objectives developed by Krathwohl (Krathwohl et al. 1965).

The internalization of interest motivation can also be connected with the concept of intrinsic motivation. Intrinsic motivation normally means behaviour that occurs in the absence of any apparent external reward (Singer & Gerson 1978). In relation to the framework of needs, intrinsic motivation could mean that the need that initiated activity will be satisfied by the activity itself, in this case by physical activity and sport or its immediate effects (Telama 1975). Extrinsic motivation means motivation that is not directly connected with physical activity and sport, such as money, acknowledgement and other rewards. The pedagogical importance of these concepts lies in the fact that extrinsic motivation may be necessary for attracting people to physical activity, just to see if they like it, but it is intrinsic motivation only that guarantees constant interest in physical activity. In practice, however, it is rather difficult to draw a borderline between intrinsic and extrinsic motivation.

3. MOTIVATION FOR PHYSICAL ACTIVITY AS A RESEARCH PROBLEM

3.1. Theoretical considerations

Seeing motive as incentives for activity, ie. as causes for behaviour, means that it is very difficult to study them, at least by means of questionnaires. The theoretical problems involved are described by Leontev (1977, 167) as follows: "Although the goals and the corresponding acts are internalized, the motives, that is, the reasons for setting these goals, do not directly enter consciousness." For instance, a person may be clearly conscious of a goal - let us say, skiing ten

kilometres - and the act, skiing - but it is not easy for him to give the reason for doing those ten kilometres. According to Leontev the paradox lies in that motivation can be opened to consciousness only objectively, by analyzing activity and its dynamics. "Internalization of motives is a secondary phenomen which is created at the level of personality only." It as particularly difficult for children to analyze their motives. Therefore it is important that participation in physical activity and sport is taken into account when schoolchildren's motivation for physical activity and sport is studied. This was done in our research programme which dealt with the interest in physical activity among schoolchildren.

One of the interesting points is the question of what kind of answers people give to inquiries concerning their motivation for physical activity. Both adults (Telama 1975) and schoolchildren (Silvennoinen 1979; Telama & Silvennoinen 1979) may present, instead of individualistic motives, normative and socially acceptable ideas which have been acquired, e.g., through propaganda and information. In inquiries such answers can be avoided by defining the motivation criteria in a sufficiently detailed manner and by emphasizing the importance of personal opinions in the formulation of the questions. This correlated with Rubinstein's view to the effect that the orientation of behaviour based on clear images reduces the emotive and diffuse characteristics of behaviour (Silvennoinen 1979 with reference to Rubinstein, S.L. Sein und Bewusstsein. Berlin 1968). Yet it is important to remember that non-internalization of motivation and normative concepts are typical for the motivation for physical activity and sport among the schoolchildren in a certain age group, which means that the studies need not necessarily be unreliable.

It is also methodologically important to know that when questionnaires are used to study motives, non-internalization of motives makes the subjects present "motivizings" (Leontev 1977) and subjective experiences with physical activity instead of real motives, i.e. incentives for activity. This does not necessarily diminish the value of the results, because the ways in which people experience physical activity may also prove to be pedagogically important. Although the results of research on the motivation for physical activity which have been acquired by means of questionnaires cannot be accepted unreservedly, it seems to me that such studies give us a fairly good overall picture of schoolchildren's motivation for physical activity in different age groups.

3.2. Methodological considerations

The results presented here are derived from an extensive research programme on physical activity among Finnish schoolchildren which was carried out by the Department of Physical Education of the University of Jyväskylä and the Research Institute of Physical Culture and Health (Silvennoinen 1979; Telama & Silvennoinen 1979).

The population of the study consisted of pupils in the fifth, sixth and eighth, and ninth grades of the comprehensive school and of students in the second and third grades (grade levels 11 and 12) of the upper secondary school. The sample was selected by means of a stratified randomcluster method, and a total of 3.106 pupils from 75 schools representing 10 provinces and 27 localities were included in the final data analyses. The rate of accepted response was 88 %.

The data was collected with a questionnaire which was mailed to the subjects in November-December 1977. Besides motives for physical exercise, pupils were also asked several questions about their leisure-time interest in physical activity, their experiences with physical education at school, and their immediate social and physical environments.

The motives were presented to the subjects in the form of 33 statements. The validity of the statements was to be judged by the subjects on the scale: not at all - to some extent - to a great extent. The statements were related to physical exercise in general, not to any specific events. They were written in the "I" form. The degree of the consciousness and internalization of the motives was evaluated with the use of a number of questions concerning conscious reflection on physical activity interests, the finding of suitable events, advance planning of physical activities, and the influence of the weather and friends on the physical activities of the subjects.

The results which will be presented here concern only schoolchildren who belong to the 11-19 age group. In our opinion, questionnaires cannot be used with younger children, and even with the 11-12-year-olds they may be somewhat unreliable. The research programme under review here also included an interview with schoolchildren in the 7-10 age group, which was concerned with the physical activity,

interests and motives of that age group. The methods used were similar to the hermeneutic approach which has been used, for instance, by Aggestedt and Tebelius (1977). The results of this inquiry are being analysed at present and are not yet available.

4. SCHOOLCHILDREN'S MOTIVATION FOR PHYSICAL ACTIVITY AND ITS STRUCTURE

4.1. Classification of the motives for physical activity

The analysis and structuring of the concept of physical activity motivation has been attempted by classifying the motives in different ways, for instance, on the basis of the theory of play, theories of need, or statistical analysis. The concepts developed by Caillois (1969) for the description of play have been widely used for the description and classification of the motivation for physical activity. According to Caillois, the nature of play can be described by means of the following parameters: Agon (competition), Alea (chance), Mimicry (pretence) and Ilinx (vertigo). It has been found out that competition, chance and vertigo in particular are important for the participation in physical activity and sport.

Kenyon's conceptual model for characterizing physical activity has a theoretical-empirical basis (Kenyon 1969). Although many of you may be acquainted with Kenyon's model, I will deal with it briefly because, to my mind, it is a fairly good indicator of the different elements embedded in the motivation for physical activity, and derived from the experience with it, and because it has been one of startingpoints for the establishment of the criteria for measuring motivation in our research programme. Kenyon presents seven dimensions of physical activity (Kenyon 1970).

"Physical activity as a social experience, which is characterized by those physical activities whose primary purpose is to provide a medium for social intercourse, i.e., to meet new people and to perpetuate existing relationships."

Physical activity for health and fitness, which is characterized "primarily by its contribution to the improvement of one's health and fitness".

"Physical activity as the Pursuit of Vertigo is considered to be those physical experiences providing, at some risk to the participants, an element of thrill through the medium of speed, acceleration, sudden change of direction or exposure to dangerous situations, with the participant usually remaining in control."

Physical activity as an aesthetic experience has "aesthetic value for the individual - that is, activities are conceived of as possessing beauty or certain artistic qualities".

Physical activity as catharsis. "When physical activity is perceived as providing release of frustration-precipitating tension through some vicarious means, it is considered cathartic."

Physical activity as an ascetic experience. "Championship performance today requires the athlete to undergo a kind of "ascetic" experience whereby physical activity for him becomes long, strenuous and often painful training and stiff competition demanding a deferment of many gratifications."

Physical activity as chance refers to the activities which "are perceived to have a sizable chance element" and which certain people sometimes value over other elements.

4.2. The structure of Finnish schoolchildren's motivation for physical activity

For the clarification of the central motive dimension, a factor analysis was performed with the principal axes method followed by a Varimax rotation. With the interpretability of the rotation solution, the eight-factor solution was chosen, which explains 23.0 % of the total variance. As in studies of interests in general (Telama 1971), the communalities of the present study were rather low.

The eight factors were named as follows:

I Fitness-performance
II Relaxation
III Sociability
IV Preference for outdoor activities
V Normative health
VI Functional health
VII Competition and achievement
VIII Improvement of physique

Each factor and factor structure will be discussed in greater detail in the next chapter.

5. THE PREVALENCE OF THE MOTIVES FOR PHYSICAL ACTIVITY AND THEIR RELATIONSHIP TO MANIFEST ACTIVITY AND CONSCIOUSNESS

The prevalence of the motives, ie. the number of the students who have considered different motives important for their own physical activities, is given in Table 1.

An Automatic Interaction Detector (AID) analysis was carried out to get a general idea of the interrelationship between motive dimensions (factors), on the one hand, and sex, age, manifest interests, and the degree of consciousness and internalization of motivation, on the other. The variables for manifest activity were frequency of physical activity, intensity of physical (physiological intensity), and participation in training organized by sports clubs. The indicator for consciousness was reflection on interests (the question was, Have you happened to think about the reason why you are interested in physical activity and sport? and the alternative answers were, yes and often, yes but seldom, not much). The results of the AID analysis are given in Table 2 (Silvennoinen 1979; Telama & Silvennoinen 1979). Although for the analysis such termonology of explanatory research as 'Explained variance' and 'independent and dependent variables' are used, the results cannot, and will not, be interpreted in terms of causal relationships.

TABLE 1. Factor structure of physical activity motives and the motive hierarchy.

	Factor									Motive hierarchy	
										Boys	Girls
	I	II	III	IV	V	VI	VII	VIII	h^2	%	%[1)]
I Fitness related to self-image											
Looseness and elasticity	63	10	10	12	09	18	17	16	52	33	33
Speed and agility	61	06	14	06	11	27	-00	12	50	37	21
Movement with good carriage	60	12	14	14	13	18	07	08	48	30	27
Self-confidience (strong, enduring)	56	13	18	02	13	30	-01	-02	47	34	15
Muscle power	43	18	06	-09	14	25	-00	28	39	40	20
Self-confidence (skills)	42	16	26	02	11	32	07	-06	39	32	19
Skills at a later age	35	14	20	-01	33	26	07	02	37	35	22
Learning of new skills	36	14	28	07	16	18	-18	19	36	38	30
II Relaxation											
Recreation and relaxation	12	57	08	13	-02	05	06	19	41	38	42
Counterbalance to school work	06	54	15	02	12	03	10	-06	34	34	36
Enjoyment and pleasure	09	49	19	19	10	13	-07	16	37	46	50
Improved alertness at school	22	46	11	13	23	10	00	08	35	31	33
III Sociability											
Meeting friends	01	16	57	02	-02	09	01	10	37	21	16
New friends	21	08	55	06	07	20	-02	07	41	31	26
Being together with people of the same sex	08	09	53	05	16	17	06	02	35	18	14
Being together with people of the cpposite sex	15	10	48	07	09	12	16	-04	32	15	16
Friends go in for physical activity	12	01	41	04	13	19	-07	12	25	23	14
IV Preference for outdoor activities											
Outdoor activities	-00	19	03	60	03	-05	05	09	42	46	65
Knowledge of environment and nature	14	08	13	58	17	05	-02	-03	42	34	41
V Normative health											
Fitness exercise is everybody's duty	14	09	15	15	52	10	03	08	36	36	34
Healthy habits of life	23	22	12	25	44	11	-05	17	41	45	48
Useful at a later age	27	24	07	01	40	12	14	21	38	52	45
VI Competition and achievement											
Success at competitions	25	04	19	05	15	55	-08	15	46	27	14
Competition for top position	20	06	21	-05	04	53	-08	06	38	21	8
Comparing with one's earlier performance	24	04	22	02	08	52	-05	02	39	15	7
Top athletics	14	13	09	00	05	51	16	06	34	17	4
Approval by one's friends	25	08	25	02	07	45	14	-06	36	13	4
VII Improving one's physique											
Improving one's physique	39	14	09	06	11	09	44	04	40	24	30
VIII Functional health											
Maintaining one's health	23	26	07	10	22	08	03	47	41	59	59
Improving endurance	34	29	08	01	27	09	-01	37	42	53	42

1) Percentage of those who have answered to motive statements "true to a great extent".

TABLE 2. Summary of the AID analysis results

INDEPENDENT VARIABLES	DEPENDENT VARIABLES[b]							
	I	II	III	IV	V	VI	VII	VIII
Percentage of explained variation	%	%	%	%	%	%	%	%
Age	0.5	8.5	1.7	1.3	3.3	3.1	11.4	0.5
Sex		0.9		5.9		11.4		2.1
Reasoning about interests	3.5	9.7			1.2			7.5
Frequency of physical activity		2.8	1.0			0.7		0.7
Intensity of physical activity	0.6			0.8		0.6		4.4
Participation in sports club training schedules	1.4		7.6	1.8		9.2	2.2	1.5
Percentage of total explanation	6.0	21.9	10.3	9.8	4.5	25.0	13.6	16.7

b) Dependent variables (factors)
I = fitness related to self-image
II = relaxation (motivation)
III = sociability (motivation)
IV = preference for outdoor activities (motivation)
V = normative health (motivation)
VI = competition and achievement (motivation)
VII = improving one's physique (motivation)
VIII = functional health (motivation)

Reference: Silvennoinen 1979; Telama & Silvennoinen 1979

5.1. Fitness - health motivation

In the Kenyon model presented above the motives connected with fitness and health were located in one and the same dimension. In some earlier studies with schoolchildren (Telama & Kostiainen 1975) and with adults (Telama 1975), the health and fitness motives have been empirically grouped within one and the same factor. In the present study, the differentiation of the fitness - health motivation is interesting. The factor analysis produced three factors in this area: fitness - motor performance, normative health, and functional health. By means of factor analysis it is possible to differentiate the factors in greater and greater detail, but what is interesting here are the different relationships that these factors have to sex, age, manifest activity and consciousness. Most fitness motives such as speed, ability, elasticity, and muscle power, are grouped within one and the same factor, which is called the fitness - performance factor. It is more closely associated with motivation related to

selfimage (selfconfidence) than it is with health. Only the endurance component of fitness is associated with the health motive (maintaining health) in the factor which we call 'functional health'. Also the appearance motive is connected with fitness - performance motivation. This phenomenon may be partly due to the way in which the variables have been selected, but among young people physical fitness probably means mainly something else than promotion of health.

Fitness - performance motivation was only weakly related to the independent variables included in the analysis (Table 2). It was primarily related to reflection on physical activity interests and secondarily to participation in training organized by sports clubs. Fitness motivation was the strongest among pupils who often think about their sports interests and take part in the training organized by clubs. It has been found out that among Swedish schoolchildren it is fitness motivation that is the most important motivation for physical activity (Engström 1974). A fairly great proportion of present-day Finnish schoolchildren - one-third of the boys and one-fourth of the girls - consider fitness motivation important. One of the most common motives is however improvement of endurance, which was considered important by about one-half of the schoolchildren (Table 1).

Health can be broken down into a normative and a functional health motive. The 'normative health' motive represents a motivation learned from health propaganda which is more superficial and less conscious than 'functional health', which is related to, eg., improvement of endurance. In speaking about the promotion of health as a motive for physical activity it is thus advisable to make a distinction between an opinion learned from health propaganda and a more personal, internalized motive.

Only 4.5 % of the normative health factor was explained (Table 2). The factor was primarily related to age and, to some extent, also to reflection on physical activity interests. This motivation was considered the most important by those 11-13-year-olds who think about their interests, and the least important by 18-19-year-olds.

Functional health motivation was most strongly related to reflection on interests, followed by the intensity of physical activity and sex. Also some other independent variables were, to some extent, related

to this motive. The total explanation percentage was 17.8 (Table 2). Independent variables have an interactive effect on the motive of functional health insofar as other variables make a contribution only among pupils who do not think about their interests. The functional health motive was the strongest among those who often think about their interests. It was emphasized the least by those who do not think or seldom think about their interests, have a very low level of physical activity and do not take part in sports club training programmes.

According to earlier studies, health motivation is very common among schoolchildren (Engström 1974, Jonas 1973, Telama & Kostiainen 1975). In the present study, too, health motivation was among the most common. Maintaining health is the most common among boys and is the second among girls; 59 % of boys and girls consider it important. Normative health motivation is also considered important by a great number of children. Is this an indicator of the importance of health in the schoolchildren's motivation for physical activity? Do schoolchildren really personally consider health such an important factor? The results for functional health motivation seem to indicate at least some degree of internalization of the motivation, but as far as normative health motivation is concerned, the opinions are mainly normative ones and derived from propaganda.

Improving physique became a factor of its own in the analysis but it should however be seen as an element in fitness motivation. The variation of the physique factor was mainly accounted for by age (11.4 %) and, to some extent, by participation in sports club training programmes (Table 2). This motivation was the most important for 11-13-year-olds, and the least important for 15-19-year-olds who do not take part in training by sports clubs. A total of 24 % of boys and 30 % of girls considered the physique motive important.

5.2. Relaxation and outdoor motives

Recreation and relaxation, which often seem to be superficial motivations related to light exercise, proved in the present study to be closely related to reflection in interests and to the frequency of physical activity (Table 2). Recreation as a motive does not mean mere pastime

but points to satisfaction due to activity followed by relaxation. Thus it seems to represent some kind of catharsis, which is one of the dimensions in Kenyon's (1970) model. Relaxation motive factor is the only one among eight factors whose importance increases with age. Relaxation motives are slightly more important for girls than for boys. A total of 31-46 % of boys and 36-50 % of girls considered them important (Table 1). Recreation motivation was stressed most by those 17-19-year-olds who think about their interests. It was given the least notice to by those 11-16-year-olds who do not think about their interests and take little or no part in physical exercise. The independent variables accounted for 21.9 % of the total variation of recreation motivation (Table 2.).

The differentiation of the outdoor - nature motivation from recreation suggests that, in Finland and perhaps also in other Scandinavian countries, moving about in nature and observation of nature are important factors motivating some people to do exercise. In this respect the differentiation of intrinsic and extrinsic motivation is a theoretically intresting question. From the viewpoint of physical activity, outdoor - nature motivation can be considered extrinsic while from the viewpoint of constant interest it may be intrinsic as well. At any rate, it is necessary in the Nordic Countries to pay attention to nature as an important pedagogical factor in physical education and in motivation. It has also been found out that nature is an important motivating factor in physical activity among adults (Vuolle et al. 1979).

Differently from relaxation motivation, outdoor motivation is only slightly related to manifest activity or correlates to it negatively (sports club training programmes). Outdoor motivation is mainly related to sex. In this factor the differentiation by sex is greatest in the way that girls consider it more important than boys. For girls, the motive "I can be outdoor in nature" is the most common one; a total of 65 % of girls consider it important.

5.3. Social motivation

As was pointed out above, Kenyon defined the social motivation for physical activity by a reference to the fact that it is important "to meet people and to perpetuate existing relationships". Similarly to competition motivation, also social motivation is closely connected with self-image and self-evaluation. According to Birch and Veroff (1968, 65), "the affiliation incentive is the attraction to another organism in order to feel reassured from the other that the self is acceptable."

The gregariousness factor related the best to participation in training sessions organized by sports clubs and, to some extent, also to age and frequency of physical activity. These variables accounted for 10.8 % of the total variation (Table 2). Social motivation was strongest among those who regularly attend training arranged by sports clubs and weakest among 17-19-year-olds who do not participate in such training.

According to the results of our study, social motivation for physical activity is not very important for a great number of schoolchildren (Table 1). Either they do not become conscious of social motivation or nowadays schoolchildren have other ways and means of affiliation and interaction, so that physical activity and sport is not important for them in this respect.

5.4. Competitiveness - achievement motives

Achievement motivation and competitiveness are one of the areas of physical activity motivation which have been studied the most. This is natural because competition is one of the basic principles in sport and competition has also been considered one of the basic elements of play (Caillois 1969). As was pointed out by Vernon (1969, 121), "achievement motivation may be associated with a variety of goals, but in general the behaviour adopted will involve activity which is directed towards attainment of some standards of excellence. It may include competition with others, in which they are surpassed. But on the other hand the individual may be chiefly concerned to set himself a high standard of performance or level of aspiration, and to reach

this through his own efforts overcoming any obstacles to his success". Martens (1978) connects the intrinsic-extrinsic dichotomy with this by pointing out that "sports always contains at least two potential goals - the intrinsic reward of feeling competent and the extrinsic reward of social approval". The social aspect, which includes, among other things, also the evaluation of other people's performances, other people's presence, and social approval caused by own excellence is very important for competitive motivation. Achievement - competitiveness motivation has its pedagogical importance mainly through the development of self-evaluation and, thereby, of self-image (see, eg., Singer & Gerson 1978).

Competition and achievement motivation was primarily related to sex, which alone accounted for 11.9 % of the total variation. Also its relationship with participation in training programmes was strong for both sexes, and even age made a considerable contribution. A total of 25 % of the variation in competitive motivation was explained (Table 2). Competitive motivation was strongest among 11-19-year-old boys who very regularly participate in training arranged by sports clubs. Competition was appreciated the least by 15-19-year-old girls who do not take part in training arranged by sports clubs (Table 2). Competition and achievement motivation interests a relatively great number of boys but only a small number of girls. The difference between the sexes is the greatest in competition motivation.

6. DEVELOPMENT OF MOTIVATION FOR PHYSICAL ACTIVITY WITH AGE

6.1. Changes with age in manifest activity

It is known that interest in physical activity changes during the school years. It is interesting to see how our information about the changes in motivation correspond to changes in manifest activity. This is also implied by the theoretical starting-point of my presentation. That is why I am now going to present a brief summary of the changes in manifest activity during school years.

Manifest activity is at its greatest at about the age of 12, that is, in early puberty, after which it is rather strongly reduced so that the greatest reduction is found in the number of those who have undergone

physical activity daily or otherwise frequently. The number of those who are totally passive does not however increase markedly during school age. The time spent on physical activity is also reduced while the time spent on other activities and homework increases. On the other hand, physiological intensity of physical activity seems to increase with age so that the number of those who carry out physical activity to the extent that they sweat and get out breath increases with age, particularly among boys. This may actually result form the fact that with age various physilogical reactions become more conscious. It is also possible that for a certain number of schoolchildren physical activity becomes more clearly fitness-oriented and decreased activity frequency and time spent on physical activity is compensated by more intensive physical activity (Silvennoinen 1979, Telama 1972, 1978).

The changes with age in different kinds of physical activities and sports are different. The greatest reduction is seen in the participation in various competitive ball games such as soccer and icehockey, and in sports other than team sports the greatest reductions are undergone by participation in track and field, skating, skiing and among boys, cycling. Sports which retain a relatively unchanged level of interest or gain in importance and which therefore have a 'carry-over value' are walking, jogging, volleyball and swimming (Telama 1978).

Although manifest activity is reduced with age, no similar reduction is noticed in the preference for physical activity as against other leisure-time activities or in the attitudes towards physical activity in school. The reduction with age of manifest activity is considered to be, at least partly, a phenomenon which is part of normal development and results from the fact that with physical, social and intellectual development there arise such a multitude of other needs that manifest physical activity necessarily decreases (Telama 1972).

6.2. Changes with age in motivation for physical activity

6.2.1. General considerations

Figure 1 summarizes the changes with age in different motivational factors through the means of the factor scores for 11-, 15- and 18-year-olds. The improved physique factor is not included because it may have been affected too much by random variation.

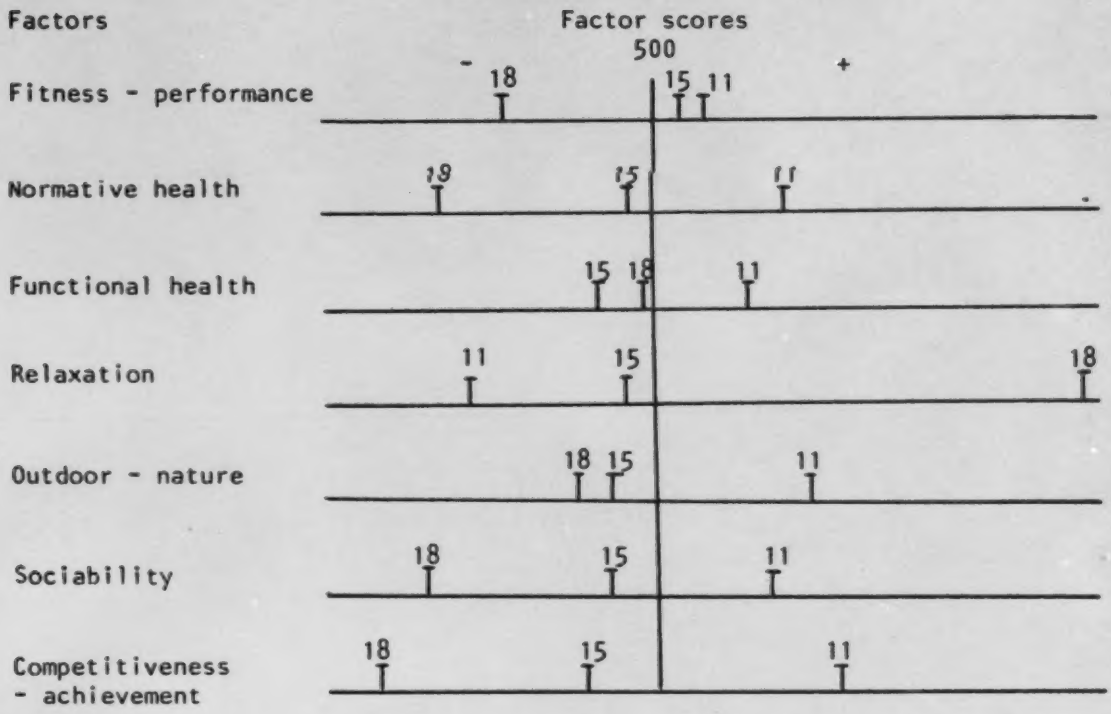

FIGURE 1. The means of the motive factors scores for 11-, 15- and 18-year-olds (Silvennoinen 1979).

The differences between age groups are generally characterized the fact that younger pupils consider all motives rather systematically more important than older pupils. This means that they are more sensitive to the statements presented about different motives. In part, this may reflect younger schoolchildren's undifferentiated, diffuse and generally positive attitude towards physical activity and sport. On the other hand, it may also be an indication of increased consciousness and differentiation and clarification with age of personal goals for activity. In the consideration of the changes with age in different motives, this systematic difference should be levelled down, but this has not been done in the results to be presented here.

Figure 1 indicates that the greatest differences between age groups are in the 'competitiveness - achievement' factor to the effect that the youngest are the most interested in competition, and in the 'relaxation' factor to the effect that the oldest are the most interested in relaxation. The age differences are also higher than the average in the factors of social motivation and normative health in that the importance of these two factors is reduced with age.

6.2.2. Age differences in fitness-health motives

In the fitness-performance motive factor, the age differences are manifested in that fitness and motor performance ability, which is related to self-confidence, is considered as important in the groups of 11-year-olds and 15-year-olds and, differently from these, less important in the group of 18-year-olds. This difference is not great if the systematic difference between age groups mentioned above is also taken into account. The greatest difference is in the motive "to acquire new skills". The emphasis received in prepuberty and puberty by performance motivation related to self-confidence can be explained by reference to the social and emotional development of young people. That particular age is characterized of the development of self-image.

The functional health factor does not include marked differences between age groups if the systematic difference is taken into account. The relative order of the age groups on the scale is interesting. Functional health is more important for 18-year-olds than for 15-year-olds. The higher mean of this factor for 11-year-olds may result from the fact that they experience also these motives in a normative way, ie. they answer the way they have been taught to answer.

In the normative health factor the differences between age groups are, for their part, clear. Its importance is reduced with age. The differences are the greatest for the statements: "I participate in physical activity in leisure-time because everybody is obliged to take care of their physical fitness" and "because I can aim at healthy way of life".

Above, it was pointed out that the normative health motives did not correlate positively with manifest activity. The changes in these motives obviously reflect reduction of normative, superficially acquired opinions and increase with age of conscious goals.

6.2.3. Age differences in relaxation and outdoor motives

The differences between age groups in relaxation and outdoor motives are great; older pupils differ markedly from those who are in prepuberty or in puberty. This is the only motive factor grown in importance

with age. Relaxation motivation was seen to be most closely related to manifest activity and reflection on interests. It seems to represent the clarification with age of personal goals of activity and the degree of consciousness and internalization of the goals. Simultaneously it also describes the development of schoolchildren's motivation for physical activity towards the end of the school period towards a greater resemblance with that of the adults. Among adults it is relaxation motivation that is one of the most important motives for physical activity (Telama 1975, Vuolle et al. 1979).

Preference for outdoor motivation, which was found out to be a type of motivation which was less strongly internalized and weakly related to activity and which therefore represented a kind of extrinsic motivation, does not undergo marked changes with age. The motive "I can spend my time outdoors in nature" grows somewhat in importance for girls with age, while the motive concerned with 'knowledge of nature' loses some of its importance with age.

6.2.4. Age differences in social motivation

Social motivation, which was seen to be strongly correlated to participation in programmes organized by sports clubs, loses some of its importance with age. This is understandable, for instance, in the light of the information that we have about social relationships in different age groups. The relatively loose play groups of childhood are first replaced by differentiated adolescent boy and girl groups, which are followed by mixed groups to be superceded, at the end of school age, by dyadic relationships. The age in which grouping is most common is puberty and the time just before and after puberty, when the dependence on the sub-culture of young people is also at its highest (Telama 1972, 19-20). The reduction of social motivation also describes development towards motivation typical for adults. In adulthood the importance of social motivation for physical activity is rather small; many adults actually say that they like physical activity because it gives them a chance to be alone (Vuolle et al. 1979).

6.2.5. Age differences in competitiveness - achievement motivation

As was pointed out above, the age differences in competitive motivation are great but the importance of competition and achievement is gradually reduced with age. As was said above, the central conceptual distinction in competitiveness - achievement motivation is comparison with other people's performance and with own performance. It could be expected that with intellectual development the personal level of aspiration and comparison with own performance would increase, at least relatively. Consideration of the age scores of different motivational statements does not give any strong support to this supposition, but it can however be seen that the age differences are smaller for the statement "so that I could observe my own progress without any comparison with other people's performance" than they are, for instance, in clear competitive achievement motivation. The decrease of competitive and social motivation with age correlated well with the reduction with age of active participation in competitive team sports.

7. PEDAGOGICAL IMPLICATIONS

7.1. Use of the dialectics of needs and activity

One of the most important starting-points for my presentation, the dialectics of needs and activity, is also important from a pedagogical point of view. The fact that needs and motives undergo changes in activity and create new needs and motives also involves the pedagogical implication that needs and motives can be learned. In addition, it emphasized the importance of activity. Competitive motivation can only be developed (and extinguished through competition. Similarly, a constant intrinsic fitness motive can be established only through own experience with physical exercise through the gradual internalization of the goal, as is pointed out by Leontev. It is a problem of pedagogy to find ways on making pupils experience different kinds of activity. When in the 1960's an attempt was made to relieve physical education in school from a too high degree of authoritarianism, an attempt was also made to pay attention to the wishes of the students in the choice of curricula. Unfortunately this was done, in many cases, in a naive way and the students were often allowed to make alone the decision as to what was to be done during lessons. This was a mistake, because it is

only a slight exaggeration to state that the pupils do not really know what they want. This statement is valid in the light of what I said previously about the difficulty in recognizing the motives. That is why it is necessary for school to offer a certain number of different kinds of experiences despite children's superficial fancies and to teach the skills and abilities necessary for the acquisition of these experiences. Some use can also be made of extrinsic motivation when motivation is developed among pupils for them to make experiments with different activities.

7.2. Teaching of goal-orientation

It was pointed out above that motives can be taught. This implies teaching of goal-orientation in general. As a pedagogical concept, goal-orientation is here used to refer to the fact that a pupil learns to perceive different kinds of goals, learns to set goals for himself, learns to move towards these goals, and learns to evaluate his own progress towards these goals. Without entering any detailed discussion I only want to point out that the prerequisites and means for learning goal-orientation include, among other things development of self-evaluation, planning of teaching through cooperation between teacher and students, and presentation of different kinds of goals and the reasoning behind them to students.

7.3. Pedagogical implications of needs and motives

When I talk about it being necessary to pay attention to needs for pedagogical purposes, I mainly mean that attention should be paid to the developmental level of the pupils and to the goal of constant physical activity. Although needs and motives can be learned, it is obvious that certain needs and motives are more natural and more probable at certain developmental stages.

It is natural that during the period of rapid physical growth and fast motor development at puberty young people are interested in comparing performance and in achievement. This was also seen to be important for social and emotional development and particularly for the formation of self-image. Interest in one's own performance can also

be explained by means of intellectual development. When, in accordance with Piaget, a young person moves in his intellectual development from the period of concrete operations to the period of formal operations, at about the age of 12 to 15, he is able for the first time to set himself as the target of his own thinking and evaluate himself from the viewpoint of other people. Because he is not however able to distinguish his own thoughts from the thoughts of others, he believes that other people are as interested in his appearance and behaviour as he in interested in them himself. This is what Piaget calls adolescent self-centredness (Elkind 1974). The transfer over to the period of formal operations is important also for the development of consciousness and teaching of goal-orientation.

Competitive motivation and social motivation are motives that are typical for a certain period of development, and that is why they no longer appeal similarly to students in upper secondary school. We have already seen that competitive motivation and social motivation lose some of their importance during school age and participation in leisure-time competitive team sports decreases considerably. However, the proportion of icehockey and soccer in physical education curricula of Finnish schools increases in later school years (Nupponen 1979). Also upper secondary school students like playing icehockey in physical education periods but it seems that they do not experience it so much as competition as exercise for physical fitness and relaxation. The pedagogical problem involved is the question of what becomes of their fitness and relaxation motives in adult age after school.

Preparation for constant physical activity is thus another important point when motives are considered for pedagogical purposes. It is to be remembered that a mere motive is not sufficient for manifest activity; in addition, personal abilities and proper physical environment are also necessary. That is why proper attention should be paid, in upper-grade physical education in schools, to the use of recreation motivation and outdoor - nature motivation by giving information and providing people with skills necessary for carrying out activity in accordance with these motives.

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(*see also the present* Research Institute of Physical Culture and Health. Yearbook 1979. Jyväskylä. P. 70-77.)

Martti Silvennoinen

ON THE CONNECTIONS BETWEEN SPORT MOTIVES AND MANIFESTED PHYSICAL ACTIVITY AMONG SCHOOL-AGED BOYS AND GIRLS

Fifth European Congress for Sports Psychology, FEPSAC, Varna, Bulgaria, 17.-21.9.1979

1. INTRODUCTION

The results reported in this paper are part of a research project on pupils' physical activity interests in Finland which was started in the autumn of 1976. The project is carried out within the framework of a larger research programme in school physical education, which from 1975 has been carried out with the financial support of the Ministry of Education at the Research Institute of Physical Culture and Health in Jyväskylä.

The sport and physical activity interests of children in the age of compulsory education were approached from several perspectives. This paper deals with one section of the research data: the description of the structure of sport motives and the analysis of the relationship between motives and manifest physical activity interests.

The results of a pilot study carried out within the motivation project of the larger research programme were presented by the author to the Fourth ISSP World Conference in Prague in the autumn of 1977.[1)]

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1) Comprehensive school pupils' motivation for sport and physical activity. IV. Světovy Kongress ISSP, Praha, 3.-9.10.1977. Collection of papers. (Prague 1978.) P. 676-682. (also in: Research Institute of Physical Culture and Health. Yearbook 1977. Jyväskylä 1978. P. 16-25. Reports 20.)

2. DESCRIPTIVE STUDY OF MOTIVATION

Survey research, which is generally based on mail questionnaires or interviews, produces rather coarse data on averages. Consequently in the description of motivation for physical activity we are concerned with general motivation (habitual motivation), not with actual situational motivation and its dynamic variation.

If research is based only on cross-sectional data, it is not strictly speaking possible to determine the development of interest motives in individuals, in other words those experiences and situations, which over a longer period of time have contributed to the arousal, persistance or extinction of the individual's interest for physical activity.

Often motivation studies are limited to certain areas of life - eg. physical activity interests - and hence complex relations with other life activities are not revealed.

A difficult problem is the link between the categories and concepts of motivation theory and the operational measurement instruments in empirical research designs. The theoretical model and its concepts often seem inadequate in relation to measurement instruments or vice versa.

In open-ended questions the subjects can freely indicate their interests. The open-ended method has revealed that interest motives are grouped into a few rather unstructured categories among children (eg. sport is nice, you can run, you can play, etc.). This shows that the personal sense and meaning of physical activity is not fully crystallized and/or children cannot analyze it verbally.

Multiple choice questions, in which the subjects are presented with a set of reasons for interests and in which the level is that of ordinal measurement, appear to lead to exaggeration of motivation

for various interests in general and particularly among young children. Among very young children, practically speaking almost all presented interest needs are reported as important.

3. RESEARCH TASKS

The problems addressed in this paper represent only some aspects of the research project. The data is examined in terms of two research tasks:

1. Presentation of the general structure of sport and physical activity motives of 11-19-year-old pupils.
2. Presentation of how variables of the motive structure are related to manifest interests and variables indicating the internalization of interest.

4. MOTIVE SCALES

As theoretical categories 33 motive contents were considered to correspond to real objects of physical activity interests, which in spite of the fact that they are associated with the same common objective of activity - sport and physical activity interest - show considerable interindividual variation[1)]. Such individual objects of activity or motives can be e.g. pursuit of health, pursuit of relaxation and recreation, learning of skills, seeking the company of friends, etc. The motive scale was designed so as to cover the range of personal variation as well as possible, and earlier studies of the dimensions of physical activity needs provided useful information on this point (e.g. Macak 1963; Hennig 1965; Ilg et al. 1970; Kenyon 1971; Artus 1973 with reference to Baum, L. Sportbezogene Bedürfnisse und Einstellungen in der DDR-Bevölkerung. Diss. Leipzig s.a.).

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1) The personal appropriateness, relevance of contents was rated on the following scale: cannot say - false - partly true - highly true. Each content rating was to be related to one's sport or physical activity interest in general and not to any specific sport event.

5. SAMPLING AND SUBJECTS

The population of the study consisted of boys and girls in grades 5 - 6 and 8 - 9 of the comprehensive school and in grades 2 - 3 in the upper secondary school.

The sampling method was stratified cluster sampling, in which the sampling unit was the class. The four-phase stratification was based on (1) geographical and economic variation, (2) degree of urbanization, (3) type of school and (4) class level.

The final sample included the answers of 3106 pupils, which is 88 % of sampled pupils.

6. RESEARCH METHODS AND RESULTS

Traditional factor analysis was used to test how well differentiated and organized structure of physical activity motives is obtained with the measurement instrument. Factoring was performed with the principal axis method (Harman 1967) and of the five - ten varimax-rotated solutions was chosen the one which lent the most clear-cut interpretation. This proved to be the eight-factor solution which accounted for 38 % of total variation.

The basic dimensions elicited through traditional factor analysis were compared to the factors produced by so-called binary structure analysis (Allmer & Nitsch 1975). Binary structure analysis, in which each new factor solution is based on the grouping of variables obtained in an earlier solution, by means of so-called key variables (Kennvariabeln) makes it possible to proceed to the level of individual variables. Thereby is removed the problem of determining the number of factors.

Rotation becomes considerably simplified, since it is always carried out by two main axes alone. Also the interpretation of factors becomes simpler. Binary factors can be examined as a hierarchical model (Figure 1), in which the higher level class representatives are the starting-points for subsequent stages.

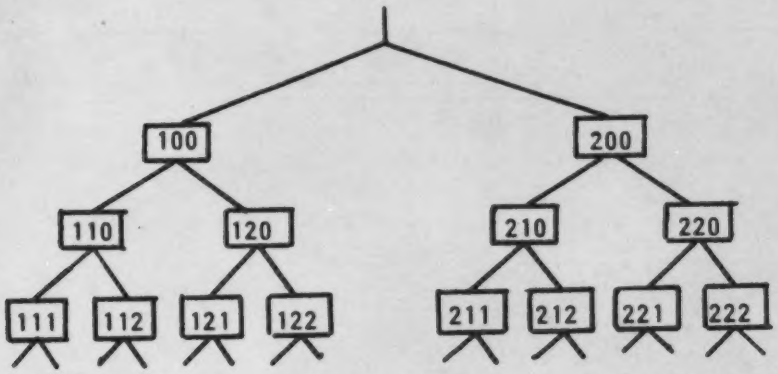


FIGURE 1. Flow of binary factorization.

6.1. General structure of motives for physical activity

Although the proportion of explained variance of the factor solution remained low, the motive structure can be regarded as quite well differentiated and structured (Table 1). Differentiation refers to the fact that interest motivation has several different dimensions of factors and structuring indicates the fact that high loadings are observed mainly on one factor, in other words each variable is mainly explained by one background factor (Telama 1971).

In the motive structure common to both boys and girls it is interesting to notice that outdoor activities form a dimension of their own (factor IV) and that in the area of health, normative health (V) and functional health (VIII) are distinguished from each other.

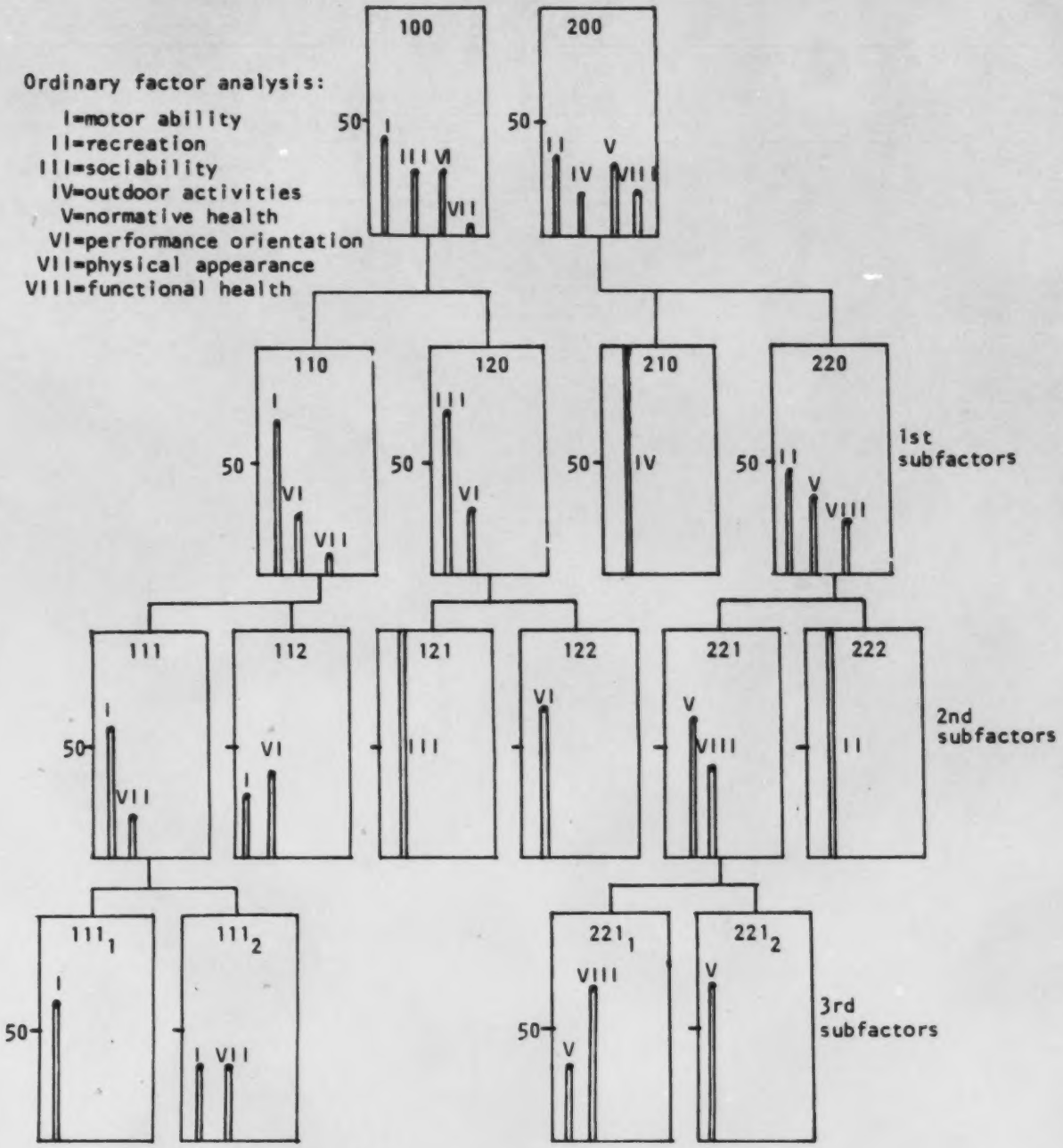
A comparison between the traditional factor analysis and binary structure analysis is presented graphically in Table 2. The comparison is based on the computation of coefficients of congruence according to a specific formula (Allmer & Nitsch 1975, 100). Coefficients of congruence are presented in Table 3. The comparison of the traditional factor solution with the binary structure analysis (Table 3) gives rise to the observations following after the tables mentioned.

TABLE 1. Factor structure of physical activity motives and the motive hierarchy.

	Factor									Motive hierarchy	
										Boys	Girls
	I	II	III	IV	V	VI	VII	VIII	h^2	%	%[1)]
I Fitness related to self-image											
Looseness and elasticity	63	10	10	12	09	18	17	16	52	33	33
Speed and agility	61	06	14	06	11	27	-00	12	50	37	21
Movement with good carriage	60	12	14	14	13	18	07	08	48	30	27
Self-confidience (strong, enduring)	56	13	18	02	13	30	-01	-02	47	34	15
Muscle power	43	18	06	-09	14	25	-00	28	39	40	20
Self-confidence (skills)	42	16	26	02	11	32	07	-06	39	32	19
Skills at a later age	39	14	20	-01	33	26	07	02	37	35	22
Learning of new skills	36	14	28	07	16	18	-18	19	36	38	30
II Relaxation											
Recreation and relaxation	12	57	08	13	-02	05	06	19	41	38	42
Counterbalance to school work	06	54	15	02	12	03	10	-06	34	34	36
Enjoyment and pleasure	09	49	19	19	10	13	-07	16	37	46	50
Improved alertness at school	22	46	11	13	23	10	00	08	35	31	33
III Sociability											
Meeting friends	01	16	57	02	-02	09	01	10	37	21	16
New friends	21	08	55	06	07	20	-02	07	41	31	26
Being together with people of the same sex	08	09	53	05	16	17	06	02	35	18	14
Being together with people of the opposite sex	15	10	48	07	09	12	16	-04	32	15	16
Friends go in for physical activity	12	01	41	04	13	19	-07	12	25	23	14
IV Preference for outdoor activities											
Outdoor activities	-00	19	03	60	03	-05	05	09	42	46	65
Knowledge of environment and nature	14	08	13	58	17	05	-02	-03	42	34	41
V Normative health											
Fitness exercise is everybody's duty	14	09	15	15	52	10	03	08	36	36	34
Healthy habits of life	23	22	12	25	44	11	-05	17	41	45	48
Useful at a later age	27	24	07	01	40	12	14	21	38	52	45
VI Competition and achievement											
Success at competitions	25	04	19	05	15	55	-08	15	46	27	14
Competition for top position	20	06	21	-05	04	53	-08	06	38	21	8
Comparing with one's earlier performance	24	04	22	02	08	52	-05	02	39	15	7
Top athletics	14	13	09	00	05	51	16	06	34	17	4
Approval by one's friends	25	08	25	02	07	45	14	-06	36	13	4
VII Improving one's physique											
Improving one's physique	39	14	09	06	11	09	44	04	40	24	30
VIII Functional health											
Maintaining one's health	23	26	07	10	22	08	03	47	41	59	59
Improving endurance	34	29	08	01	27	09	-01	37	42	53	42

1) Percentage of those who have answered to motive statements "true to a great extent".

TABLE 2. Comparison of ordinary factor analysis structure and binary factor structure by means of coefficients of congruence (coefficients Table 3.)



Interpretation of binary hierarchy:

100 Physical factor (performance orientation)
200 Psychic factor (health orientation)
110 Motor performance emphasis
120 Social community and status
210 Outdoor activities
220 Recreation-health orientation
111 Physical-motor self-confidence
112 Motor performance emphasis
121 Social community
122 Social performance emphasis
221 Pursuit of health
222 Recreation-relaxation
111_1 Motor efficiency (♂-type)
111_2 Motor plasticity (♀-type)
221_2^1 Functional health
221_1^2 Normative health

TABLE 3. Coefficients of congruence between traditional and binary factorization.

Binary factors	Key variables (number)	Congruences among traditional factors								Coefficients of congruence							
		I	II	III	IV	V	VI	VII	VIII	I	II	III	IV	V	VI	VII	VIII
100	19	8	-	5	-	-	5	1	-	.42	.00	.26	.00	.00	.26	.05	.00
200	11	-	4	-	2	3	-	-	2	.00	.36	.00	.18	.27	.00	.00	.18
110	12	8	-	-	-	-	3	1	-	.67	.00	.00	.00	.00	.25	.08	.00
120	7	-	-	5	-	-	2	-	-	.00	.00	.71	.00	.00	.29	.00	.00
210	2	-	-	-	2	-	-	-	-	.00	.00	.00	1.00	.00	.00	.00	.00
220	9	-	4	-	-	3	-	-	2	.00	.44	.00	.00	.33	.00	.00	.22
111	6	5	-	-	-	-	-	1	-	.56	.00	.00	.00	.00	.00	.17	.00
112	6	3	-	-	-	-	3	-	-	.27	.00	.00	.00	.00	.38	.00	.00
121	5	-	-	5	-	-	-	-	-	.00	.00	1.00	.00	.00	.00	.00	.00
122	2	-	-	-	-	-	2	-	-	.00	.00	.00	.00	.00	.67	.00	.00
221	5	-	-	-	-	3	-	-	2	.00	.00	.00	.00	.60	.00	.00	.40
222	4	-	4	-	-	-	-	-	-	.00	1.00	.00	.00	.00	.00	.00	.00
111_1	3	3	-	-	-	-	-	-	-	.60	.00	.00	.00	.00	.00	.00	.00
111_2	3	2	-	-	-	-	-	1	-	.33	.00	.00	.00	.00	.00	.33	.00
221_1	3	-	-	-	-	1	-	-	2	.00	.00	.00	.00	.33	.00	.00	.67
221_2	2	-	-	-	-	2	-	-	-	.00	.00	.00	.00	.67	.00	.00	.00

The first main dimensions of the motive scale are physical and psychic motivation. Motor skill and ability (I), performance emphasis (VI), improving one's physical appearance (VII) and - strangely enough - also sociability (III) are included within the "physical" motivation. Recreation (II), outdoor activities (IV), normative health (V) and functional health (VIII) constituted the "psychic" need area of physical activity interest in the measurement instrument.

It appears that social experiences obtained in sport and physical activity and their pursuit are clearly related to physical ability among preschool-aged children and to social status acquired through it among peers. The factor of social performance (122) also points in this direction. As the binary structure indicates, social motives also contain a factor of social companionship (121). The distributions, by age group, of individual variables representing the area of sociability indicated that the significance of sociability decreased clearly with age.

Clearly identical factors with a correspondence coefficient of 1.00 were outdoor activities factor (IV/210), sociability factor (III/121) and recreation - relaxation (II/222).

Greatest diversions were found in the contents of motor ability (I), normative health (V), performance emphasis (VI), physical appearance (VII) and functional health (IV). In binary structure analysis, ability based on motor self-confidence is subdivided into so-called effective motorics, which is typical of boys, and plastic motorics, which is typical of girls. This interpretation is confirmed by the fact that in an open-ended inquiry about the reasons for popular contents of physical education at school boys did not give any answer indicating aesthetic experiences (Silvennoinen 1979).

6.2. Correspondence between motive structure and manifest interest

The relationships between the factor structure and so-called explanatory variables obtained through AID-analysis are presented in Table 4. AID-analysis (Automatic Interaction Detector) computes the interactions and the reciprocity between the variables included in the model, in which there are several independent and one dependent variable at a time.

TABLE 4. Summary of the AID-analysis results.

INDEPENDENT VARIABLES	DEPENDENT VARIABLES[1]							
Percentage of explained variation	I %	II %	III %	IV %	V %	VI %	VII %	VIII %
Age	0.5	8.5	1.7	1.3	3.3	3.1	11.4	0.5
Sex		0.9		5.9		11.4		2.1
Reasoning about interests	3.5	9.7			1.2			7.5
Frequency of physical activity		2.8	1.0			0.7		0.7
Intensity of physical activity	0.6			0.8		0.6		4.4
Participation in sports club training schedules	1.4		7.6	1.8		9.2	2.2	1.5
Percentage of total explanation	6.0	21.9	10.3	9.8	4.5	25.0	13.6	16.7

1) Dependent variables (factors)
- I = fitness related to self-image
- II = relaxation (motivation)
- III = sociability (motivation)
- IV = preference for outdoor activities (motivation)
- V = normative health (motivation)
- VI = competition and achievement (motivation)
- VII = improving one's physique (motivation)
- VIII= functional health (motivation)

Reference: Silvennoinen 1979; Telama & Silvennoinen 1979

The following is a summary of findings, which were obtained by combining the results in Table 4 with the results of factor analysis in different age groups and with distributions of individual variables.

1. The need area of motor ability has the most clear-cut structure among 11-13 -year-olds (self-certainty, mastery, skill). It is related to activity in sport club programmes and conscious reflection

of one's interests. In older age groups motor ability and self-certainty are not equally clear-cut.

2. The need area of recreation-relaxation is clearly related to conscious reflection of one's interests and its meaning increases clearly with age. The recreational content is most strongly emphasized by 13-16 -year-old girls, who frequently engage in physical activity during leisuretime and think about their interests, and those 17-19 -year-old boys, who on the whole think about their interest. Recreational need basis is thus combined with actual physical activity, through which one consciously seeks for cathartic experiences.

3. The need area of sociability is most strongly related to participation in sport club training. However, reciprocity cannot be explained only by the fact that social motives would guide young persons to sport clubs. At least part of the association is probably explained by the fact that sport club activity does not only give models of social activity for young people but it also makes them susceptible to answering inquiries in ways which emphasize co-operation.

4. The need area of outdoor activities is slightly strengthened with age and is more important among girls than boys. With girls outdoor activities are not associated with physical efficiency nor with reflection of one's interest, in other words there are groups among girls for whom simply being outdoors is a sufficient incentive for physical activity.

5. The area of normative health is clearly age-specific in that it is least frequently cited as a motive for activity among 17-19 -year-old boys and girls. The motive contents of normative health are not, either, related to actual active interest in physical activity, but are related to conscious reflection of one's interest, which reflects the impact of propaganda for physical activity even among the youngest age groups and the susceptibility of these age groups to respond in a way favourable to public health.

6. It appears that in the need area of performance emphasis the structural aggregate of competition, social dominance and physical ability of youngest pupils is differentiated among 17-19 -year-old age group into an area of performance emphasis (competition), which

indicates that the competitive features of athletics and physical activity are structured and differentiated. Although performance emphasis decreases strongly with age, active sports club membership helps to preserve it among boys even beyond puberty.

7. The significance of physical appearance increases with age particularly among girls. This motive content is related to the area of motor ability.

8. Functional health exhibits greatest structural variation among 11-13 and 14-16 -year-olds. It is clearly related on the one hand to conscious reflection of one's interests and on the other hand to intensity of physical activity and participation in sports club training.

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3. RESEARCH PROJECT ON POPULATION'S SPORTING BEHAVIOR

The purpose of the research project on population's sporting behavior is to produce information on man's physical activity in relation to those individual psychological, social and environmental factors, which determine and change sports behavior in Finland, as well as to develop a frame of reference of these factors. The goals of the project could be expressed as follows:

1. The qualitative and quantitative reporting of the population's sporting behavior, as well as the reporting of the population's prerequisites for sports behavior and the factors affecting them
2. Investigation of the population's motivation for sports
3. Development of a theoretical frame of reference of sports behavior
4. Development of a follow-up system for sports behavior.

A random sample of 3'985 persons was taken from the population register in 1977, which represents the 16-year-old Finnish population. The sample was stratified regionally and according to the urban/rural division. Questionnaires mailed were used in data collecting, and the rate of response was 78 per cent.

In 1978, investigation started on the second research purpose, i.e. motivation of the population. The purpose of this subproject is to investigate the motives, limitations and development of sports behavior as well as factors affecting them. Data collecting is carried out by interviewing a representative sample of the Finnish adult population, who will be asked for a physical check-up in the Research Institute.

The purpose of the follow-up study system of sports behavior is to disseminate information on the possible changes of activity among the population and the effects of different physical education policies on these changes.

In addition to the former, the project includes several subprojects, of which the following are to be mentioned:

1. The effects of mass media on the population's sports activity
2. Sports behavior of special groups
3. The effects of directive information dissemination and education on the sports activity of the population.

The project is carried out with the Department of Physical Education, University of Jyväskylä, with grants of the Ministry of Education.

Pauli Vuolle & Risto Telama & Lauri Laakso

A MULTI-PHASE EVALUATION OF PHYSICAL ACTIVITY MOTIVATION THROUGH A QUESTIONNAIRE AND FOCUSED INTERVIEW

XXIIth International Congress of ICHPER,
Kiel, FRG, 23.-28.7.1979

1. BACKGROUND AND AIM OF THE STUDY

When the activation of people increases its importance as one of the main goals of the policy in physical culture and the creation of habitual interest in physical activity gains more weight in school physical education, the need and significance of knowledge will naturally extend on physical activity motivation.

This paper reports on research on the physical activities of the Finnish people carried out jointly at the Research Institute of Physical Culture and Health and the Department of Physical Education of the University of Jyväskylä. The purpose of the present sub-project was to study the structure of people's physical activity motivation and factors related to it. This paper describes the construction of the method for the measurement of motivation and presents preliminary results concerning the motive structure.

2. THEORETICAL FRAMEWORK

The theoretical starting point of the present study has been the conception of the close unity of action, consciousness and motives, and, especially the note of the significance of consciousness in physical activity motives (a.o., Leontev 1977, Petrovsky 1973). Activity of an individual is based on needs, which can be either biologigal or acquired. It is, however, characteristic of human activity, that the content of activity is not totally determined by the underlying need. When action has been evoked by need, it is rather the conscious goal that will regulate activity.

For instance, physical activity interest can be evoked by concern of one's state of health but new goals and needs can arise through conceptualization[1)] of action in the actual domain of physical activity, e.g., the need for self-development. It is also characteristic to the diversity and manifoldness of human action that the same need can lead to different actions or the same action can satisfy different needs. It is important both for theory of physical activity motivation and for the practice of physical education teaching that motives for physical activity change and develop in action. Essential part of the goal of habitual physical activity interest is the internalization of the interest goal. Consciousness and conceptualization of the goal play an important role in the internalizing process. The research of motives should, consequently, have as one of its central objects to find out relations between motives and physical action or behavior.

Motivation for physical activity has mostly been investigated by inquiring subjects' motivation for physical activity in general without relating it with activity forms, and structured questionnaires are often used. This has, for its part, contributed to acquisition of knowledge on motivation for physical activity, but, on the other hand, there are some problems connected with this kind of procedures. People meet difficulties in conceptualization and analysis of reasons for their behavior especially when motives are inquired in general phrases and without dependance on concrete, specific forms of action. Structured inventory of motive statements, which benefits from comparability of data, can increase the amount of normative responses. Normative responses are here used to mean the kind of learned comprehensions

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1) subject's individual recognition

which have been produced by propaganda in physical culture, such as the healthiness of physical activity, but which actually do not belong to the subject's individual motives. Corresponding responses have been sorted out as well in pupils as adults (Telama & Silvennoinen 1979; Telama 1975). Answering motive statements of general character can also be difficult because a person may have interest in many different forms of physical activity connected with potentially different motives.

The previous points of view support a procedure where investigation of motives is linked with concrete forms of physical action and which is operated with unstructured and individual approach. When individual conceptual contents are investigated the measurement of motives should as much as possible proceed through investigation of reasons for behavior as well as through clarification of relations between motive contents and motive chain.

3. METHODS

Within the present study a two-phase questionnaire-interview method has been developed. At the first phase all subjects answered the same questionnaire for usual social and occupational background factors and, additionally, for frequency and intensity of physical activity interest and interest in different forms of physical activity. The second phase comprising an interview about factors resisting physical activity motives or interest was based on the questionnaire answers. The interview started with questions concerning the most prefered form of physical activity. It was asked why the interviewee is interested in a particular form. This was followed with more specific questions. For instance, if one's primary motive was answered to be fitness, the following question would be, what fitness means to the interviewee. After that motives for the most often performed form (if not the most prefered one) were asked with specifying questions. Questions were also made on motives for the physical activity form next to the most prefered one. Answers were recorded in writing as accurately as possible. Those who had stated to have no physical activity interest in the questionnaire phase were asked for factors resisting the interest.

For comparison subjects were at the interview requested to evaluate their motivation for physical activity in general according to Kenyon's (1971) Scale. Although the method is designed for adults, it can also be applied to pupils.

The subjects of the study consist of all (600) persons employed for a period of 10 or more years by the town of Jyväskylä in Central Finland representing all occupational levels. The group is non-selected in terms of movement ability and physical activity interests.

4. PROBLEMS

1. To find out the workability and reliability of the method
2. To describe physical activity motives of the adult population
3. To find out relations between motives and physical action (behavior)
4. To compare the structured motive scale and the motive contents produced by the unstructured method.

5. RESULTS

The responses from the unstructured interview were classified to 92 motives, which were preliminarily reduced to 12 categories. Final motive structures are to be formulated in the definite analyses. The motive subdomains are distributed according to the most prefered activity and the two secondary activities.

Subdomain	Favorite activity %	Secondary activity %	Tertiary activity %
- outing, nature	20	16	11
- event-related factors (e.g. time saving, pace, diversity, ease, facility)	18	15	16
- relaxation and refreshing impressions	16	9	9
- health, fitness, performance capacity	16	18	21
- experience of social intercourse	2	6	7
- conditions, environment	3	4	4
- other subjective motives (e.g. "chance-to-move", commuting or shopping walk/ride, pleasure, "need-to-move")	16	17	16

The single subdomain of "outing, nature" contains experience of nature, outing and relaxation or refreshing impressions as its most common motives. Comparison of the most prefered form of physical activity and the next two forms showed interesting differences. Motives of the primary one are expressive, and outing and nature as well as relaxation and recreation impressions become clearly pronounced especially in the most prefered form of physical activity. Motives are more instrumental in the other activities, in which interest is most often designated by health and fitness. Emphasis of social intercourse along with them in the same connection probably indicates the meaning of circle of friends or friend for the particular interest. When Kenyon's structured motive scale was used for assessment of the subdomains of the principal motive, the responses of the subjects were distributed subsequently: (The assessment scale of the principal motive included "absolutely correct", "quite correct", "cannot say", "not quite correct", "absolutely incorrect".)

Subdomain (Kenyon's Scale - %)	
1. Social experience	7
2. Health and fitness	30
3. Pursuit of vertigo	21
4. Aesthetic experience	6
5. Catharsis	29
6. Ascetic experience	8

In uniform with many earlier inventories, this result, too, exhibits "health and fitness", "catharsis" (relaxation, recreation, a.o.) and "pursuit of vertigo" (change, risk, a.o.) as the three most common motives. The first two were current motives also in the unstructured interview. On the other hand, the structured motive scale does not make the previous principal motive of "outing, nature" manifest. It can well be concealed in the alternatives of the structured motive scale, from which the most obvious are the motives of "catharsis" and "pursuit of vertigo". Motives produced by the unstructured and structured methods were compared with each other by observing the distribution of motive responses in the dimensions of the three most common structured motives.

TABLE 1. Relation of structured motives with unstructured motives

UNSTRUCTURED MOTIVES	STRUCTURED MOTIVES Health %	Catharsis %	Vertigo %
Health, fitness, performance capacity			
- fitness in general	6	3	6
Relaxation and refreshing impressions ("catharsis")			
- relaxation	8	9	9
Outing, nature			
- outing	10	10	10
- nature, (scenery)	8	9	9
Phys.act. form -related factors			
- ease, facility	5	5	5
- diversity		5	5

All three principal motives in the structured scale constitute of almost similar contents. Outing, experience of nature and relaxation and refreshing impressions feature each of the motives in the inventory frequently. Even though interpretation is made difficult because the structured motives are not mutually exlusive, the results suggest that the differentiation of motives can be perceived on a structured scale but the differences cannot be recognized when motives are investigated with 'soft' technique. This notice seems to support the assumption that structured motive inventories produce normative responses.

The interview focused on the subjects' interest in concrete forms of physical activity (events). In the five events mostly prefered, which were skiing (21 %), walking (20 %), jogging (11 %), swimming (11 %) and cycling (11 %), the interest was most clearly explained with the following motives:

Skiing — outing (20 %), nature-bound (14 %), easy, facile (8 %), relaxing, refreshing (7 %), promoting fitness in general (6 %), diverse (rich) (6 %), joyful, pleasurable (6 %)

Walking — outing (22 %), relaxing, refreshing (12 %), nature-bound (8 %), promoting fitness in general (8 %), suitable for weight regulation (6 %)

Swimming — joyful, pleasurable (14 %), diverse (rich)(13 %), attraction of water (13 %), easy, facile (9 %), relaxing, refreshing (7 %)

Jogging — relaxing, refreshing (19 %), outing (14 %), suitable for weight regulation (10 %), promoting fitness in general (5 %), counterbalance to work (5 %), nature-bound (5 %), joyful, pleasurable (5 %)

Cycling speed (18 %), promoting fitness in general (9 %), outing (9 %), convenient way of travel (9 %), suitable for weight regulation (5 %), nature-bound (5 %), easy, facile (5 %)

The most favored events and their motives are closely connected with expressive experience of nature and environment. It is in the first place notable that, for instance, health and fitness do not, when a motive is linked with concrete form of activity, appear as central as on a structured scale. On the other hand, factors related with concrete forms of physical activity like "attraction of water", "speed", "convenient way of travel" are presently perceived. These are the very motives which are not exposed on a structured scale. The third important ascertainment is motives are strongly individual-concentrated. Sociability, which is often underlined as one of the basic motives for physical activity interest, does not seem to have strong direct evidence among the unstructured, 'event-related' motives. On the contrary many subjects actually say that they like physical activity because it gives them a chance to be alone.

The present research findings of our study are based on preliminary analyses. The findings, however, indicate that there are some substantial dependences between the methods used and the motives produced. Further study will concentrate on more detailed analysis of the phenomena described in this preliminary report. The prospective analyses involve investigation of the general dependance between the individual conceptual degree of motives and the method used both in general context and also on different levels of activity. Considerations about the normative knowledge - or normative conceptualization - are to be attested. For instance, the question is whether the normative knowledge is increased and reinforced with the rise of activity or whether the process is from earlier normative motives towards more rational contents and, at the same time, with transformation into subjective motives. Substantiation of the last-mentioned alternative would mean that structured motive scales, which seem to advocate normative responses, would have their most valid function in surveying the motives of people constantly and often engaged in physical activity.

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Pauli Vuolle

MASS MEDIA AS MEDIATOR OF INFORMATION RELATED TO PHYSICAL EDUCATION

International Conference on Physical Training and Sport, AIESEP, Split, Yugoslavia, 25.-30.9.1979

A Unesco conference of experts on mass communication held in Paris 1972 stated that the present generation spends more time on mass communication than in all institutions of education together and simply as a branch of industry the production of mass communication, so-called consciousness industry, has become one of the most important industrial branches (UNESCO 1972).

At the Unesco conference mass communication was understood as transmission of messages by technical means, which is characterized by publicity and a large, in principal self-selected audience. The "message" was understood to include all kind of material from so-called serious transmission of information to various areas of music and entertainment.

Thus about ten years ago Unesco addressed itself to the problem of the transformation of mass communication from a means of production to a regular productive force. It was strongly underlined that mass media alone deserve increasing attention by decisionmakers responsible for looking after the overall interest of society.

Since the Paris meeting the technical development of media has greatly increased the possibility of mass communication to reach and influence the general public. Mass communication has grown into big business, which often competes - with obvious success - for the attention of the audience with other institutions that also have information mediation tasks in our society.

It cannot be a matter of indifference to a physical educator, either, what kind of image of sport and physical activity pupils get through the press, radio and television. Do mass media support physical education at schools or is it so that the information contents of sport pages, the radio and TV programmes guide a young person's physical activities towards goals which are not integrated with the aims of school education or are alien to them or even in conflict with them. Does mass communication about sport tend to extinguish the abilities and readinesses learnt during physical education lessons at school, does it lead to the unlearning of its objectives and activities, or does it support them and theory bolster socialization into a physically active person? What values and what kind of worldview does the mass communication about sport present to the audience? The last mentioned question is relevant because some recent studies have indicated that more conservative values are a function of exposure to televised sport (Prisuta 1979).

For a person working in the area of physical education it is important to be aware of the possible effects of mass communication about sport because sport and athletics have a rather prominent position in mass media and their popularity as a specific type of programme and newsmaterial is high among pupils. During major sport events the position and popularity are enhanced. A study with Finnish schoolboys during 1976, the year of the Olympic Games in Montreal, indicated that almost 60 % of schoolboys watched television or listened to the radio whenever they had a chance (Table 1). About 20 % of the respondents followed the games without any great personal involvement. Boys in the upper level of the comprehensive school (grades 7-9) were more active watchers and listeners than boys in the upper secondary school.

TABLE 1. Following the Olympic Games in Montreal through radio and television and press, in percentage (Vuolle 1978)

	TV, RADIO			PRESS		
	Upper level	Upper secondary school	Total	Upper level	Upper secondary school	Total
	%	%	%	%	%	%
Hardly at all or occasionally without further personal interest	16	27	22	26	42	35
Nearly all broadcasts covering one's favourite event	15	24	20	26	26	26
Nearly all programmes	69	49	58	48	32	39
%	100	100	100	100	100	100
N	129	170	299	129	173	302

	x^2	df	p
- TV, radio	12,55	2	<.01
- Press	9.32	2	<.01

The demand for sport material indicated by its popularity and its supply which indicates its position in mass media are related to each other. On account of the passive nature of consumption the supply of sports material creates demand rather than vice versa[1)]. A couple of observations will suffice to disclose the wealth of supply of sport material in the Finnish television and in major newspapers with a nationwide circulation. A study by the Finnish Broadcasting Corporation from the year 1977 indicated that during

1) When supply increases, it is particularly important to know what is the source of sports material and who controls the production of it. From the flow of messages received by the general public in Finland 60-70 % comes from sources under parliamentary control, about 5 % from sources controlled by sport federations and about 25-35 % are from commercial sources. (Nordenstreng 1974)

three periods of equal length (I=7.-20.4.1977, II=20.6.-3.7.1977, III=19.12.1977-1.1.1978) the TV's total programme time and the proportion of sport were as follows (Haapasalo 1977 a,b; Kytömäki 1978).

	Total braodcasting time (hrs)	Sport programmes number	time	% of total programme time
I Spring 1977	157 h 45 min	8	2 h 55 min	1.8
II Summer 1977	114 h 40 min	18	16 h 35 min	14.5
III Winter 77-78	191 h 20 min	15	14 h 50 min	7.8

The above figures do not include sport material sent during TV news, which a rough estimate was broadcast 2-3 times a week and about 10-12 minutes per week.

In the research project on motivation underway at the Research Institute of Physical Culture and Health it was studied eg. how much sport information was published in the leading Finnish daily newspapers[1] during the so-called normal period (17.-23.4.78) and during the ice-hockey world championship games (8.-15.5.78).

During the normal period when no major sport events were underway, sport occupied about 12 % of the contents of leading daily newspapers (Table 2). During major sport events the share of sports increased by about 6 %.

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1) Daily newspapers are affiliated with political parties as follows

Turun Sanomat; Helsingin Sanomat - independent
Aamulehti - Conservative Party
Suomenmaa - Centre Party
Demari - Left-wing Party
Kansan Uutiset - Left-wing Party

TABLE 2. Percentage of sport out of total amount of text in daily newspapers during a week

Daily	I (%)	II(%)
Turun Sanomat	19	25
Aamulehti	15	23
Helsingin Sanomat	12	19
Kansan Uutiset	10	16
Demari	10	14
Suomenmaa	7	10

In the Finnish society several institutions share the responsibility for transmitting values, knowledge and skills. From the educator's point of view they can be divided into two main groups: home as the environment of social growth and formal educational institutions (Figure 1). The mass communication of sport as well as physical education in school belong to the latter group.

Educational institutions affect young people's physical activity and their whole world outlook guiding and transforming it. This influence may be conscious activity (education) or unconscious activity (indoctrination). The ideal of integrated education is realized when there are functional links among formal educational institutions and between them and the home. Lack of such links results in isolated and limited social experiences as well as fragmented worldview and world outlook.

Problems of education arise from the fact that information systems, which function in different ways under social control, come to disagree with each other in terms of goals. This may, in turn, be due to the fact that there is no clear cut division of labour between knowledge institutions and their co-operation is weak or non-existent. Mass media may not transmit enough educational information and it may be selected by "channel controllers" in a manner, which is not compatible with educational objectives. On the other hand physical educators may not in their work make sufficient use of the possibilities

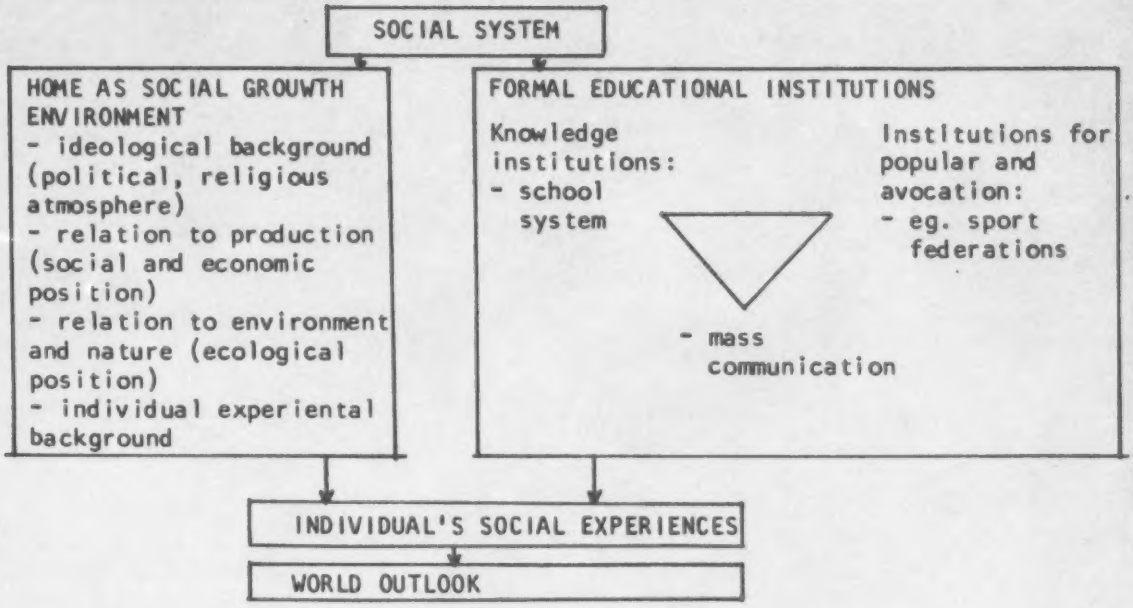
SOCIAL SYSTEM
HOME AS SOCIAL GROUWTH ENVIRONMENT
- ideological background (political, religious atmosphere)
- relation to production (social and economic position)
- relation to environment and nature (ecological position)
- individual experiental background
FORMAL EDUCATIONAL INSTITUTIONS
Knowledge institutions:
- school system
Institutions for popular and avocation:
- eg. sport federations
- mass communication
INDIVIDUAL'S SOCIAL EXPERIENCES
WORLD OUTLOOK

FIGURE 1. Social connections of educational institutions.

offered by material published in mass media. For instance, the increase of violent behavior in sport and its display on the TV screen or on newspaper pages is a serious ethical and moral problem for physical culture, which P.E. educators should address in their teaching. Taking concrete examples the educator should show that fair play is possible only when there are clear moral ideals and a conscious world outlook. This presupposes that behaviour is gradually freed from aggression released through situation-bound motives.

I will now approach the problems of my topic by discussing first the position of one formal educational institution, the mass communication about sport, in the field of information about sport and physical activity in general. I will base my presentation on a theoretical framework which I call the flow chart of information about sport and physical activity and which is based on the classical three-stage model of communication: production of knowledge - communication of knowledge - reception of knowledge (Figure 2).

Besides using the figure to illustrate how information about sport and physical activity is communicated in Finland, I will use it

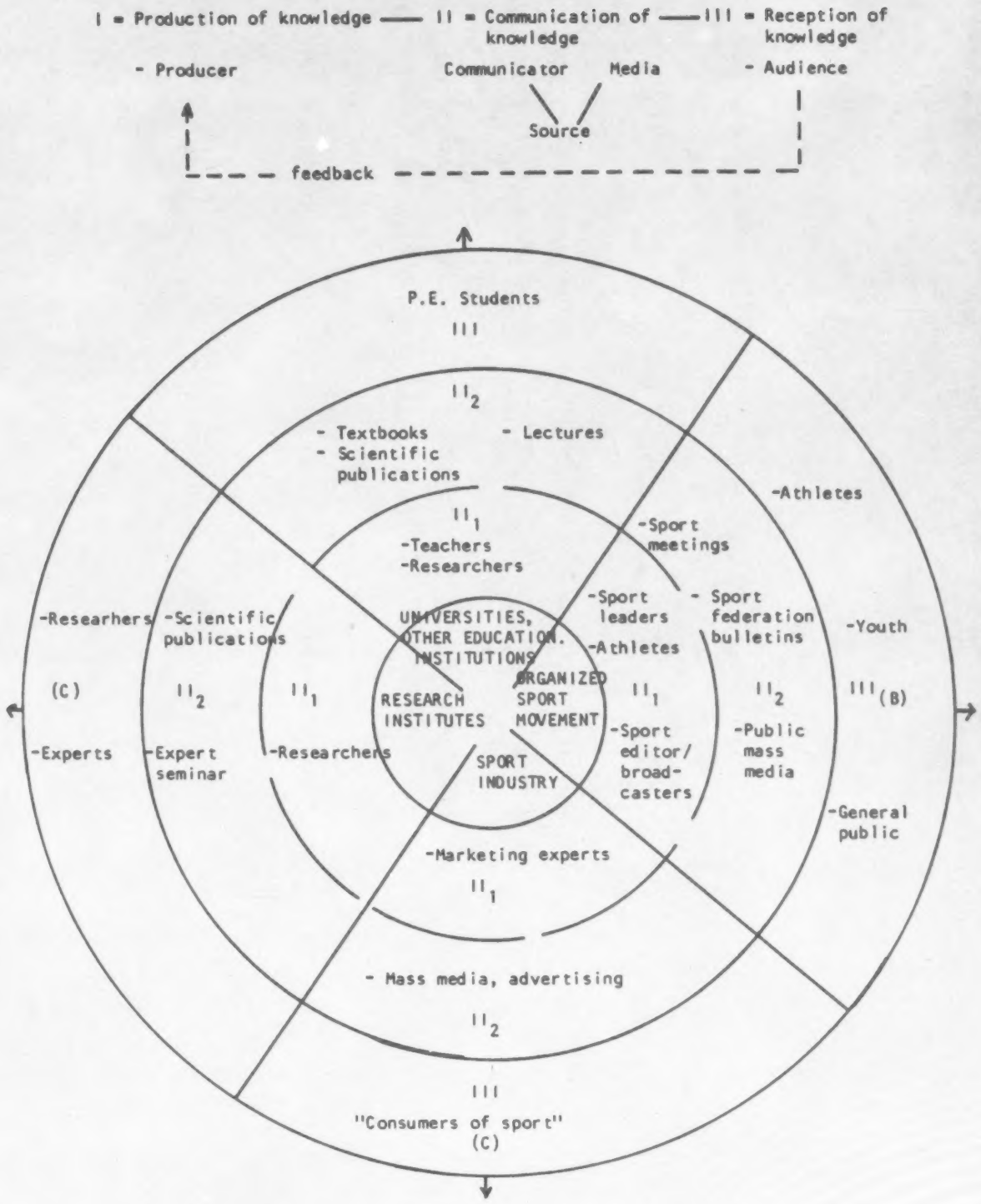

FIGURE 2. Flowchart of sport information.

to discuss matters of content in mass communication and physical education. In this connection I will present some empirical observations made in the aforementioned motivation project.

Four main producers of knowledge are mentioned in the flow chart of sport information: systems of physical education science and research (research institutes), systems of teaching and research (universities and other educational institutions), organized sport movement and sport industry.

Each system has its own mechanism for information communication (communicator and medium) and its specific audience.

Scientific information produced at research institutes is communicated through scientific publications and expert meetings first to other researchers. In addition to these primary target audiences knowledge may reach - after a lengthy time lag, it is true - other secondary target audiences: decision makers and even the general public.

Knowledge produced by universities (faculties of physical education) is mediated by researchers and teachers through lectures, textbooks and scientific publications to the primary target audience, in other words physical education students. In their subsequent functioning as practising teachers physical education students communicate knowledge to secondary target audiences the most prominent one being pupils.

Knowledge produced within the independent and strongly organized sport movement (sport federations) is communicated by functionaries, athletes and sport editors and broadcasters. Through sport meetings, federation bulletins and public mass media knowledge is transmitted in the first place to the primary target group, the sporting youth, and to the secondary target group, the great public.

Knowledge is produced and communicated by sport industry as well. It markets its products by advertising sport equipment and outfit to sport consumers in public mass media.

Knowledge transmission within sectors is called vertical communication of knowledge and knowledge transmission between sectors is called horizontal knowledge communication. Traditionally the sectors tend to be isolated - the functional knowledge transmission varies in different sectors - which means that there may be problems and dysfunctions in the mechanisms of knowledge transmission both in the vertical and horizontal direction.

In the hypothetical flow chart of sport information mass communication has been seen to serve primarily organized sport movement (most conspicuously competitive athletics) and sport industry. It is considered that knowledge produced by research and educational institutions is mediated by mass media to such a small extent that in the chart they have not been mentioned as direct mediators of produced knowledge. It is worth drawing attention to the indirect transmission of knowledge made possible by co-operation between different factors, in other words to study the possibility that research and educational information may be transmitted to mass media through sport federations and sport industry. It was pointed out earlier that co-operation between sectors has traditionally been scarce. It is difficult to find evidence of contacts with sport industry which would be significant from the point of view of information communication. The main reason is the fact that the function of the commercial transmission of information by sport industry is different from "the informative function of knowledge transmission aiming at intellectual activation" which is the main purpose of knowledge institutions (Ahmavaara 1970). By contrast, there has always been some co-operation between sport federations and institutions producing knowledge concerning physical education, particularly in the area of athletic education.

The direct or indirect transmission of educational knowledge from knowledge producers to mass media can be assessed by analysing the qualitative structure of mass communication about sport. The contents of mass communication have been classified in many ways depending on the purpose and type of study. In this case the division into orientating, practical and entertaining knowledge seems appropriate (Pietilä 1971).

Orientating knowledge is relevant for our world outlook. It means such general knowledge about the individual and social meaning of physical activity and sport which is not dependent on everyday situations. So-called theoretical knowledge is orientating knowledge. In physical educator's work orientating knowledge is the basis of educational activities.

It is an instance of practical situation-specific knowledge when mass media inform people about possibilities of physical exercise: where to find tracks for jogging, what the fitness cyclist should take into account in buying a bicycle etc. The physical educator also needs practical knowledge, but goal oriented education cannot be based on it.

Entertaining knowledge produces momentary pleasure or satisfaction. It can be experienced as a value as such without our testing our world outlook with it or without using it to aid us in our daily experiences. Sport reporting and broadcasting are typical examples of entertaining knowledge.

Available research information and everyday observations indicate that sport information transmitted by mass media, radio, television and the press, is mainly entertaining in charter. Much less space is devoted to practical knowledge and very little space to orientating knowledge indeed. With regard to the press this is shown by the results of an analysis, carried out in the afore-mentioned motivation project, in which the sport headlines of leading daily newspapers were classified into three categories during the so-called normal period and during the period of ice-hockey world championship games (Table 3). Although the differences are not very great, it is interesting to observe that entertaining knowledge was found more in so-called independent and right-wing press and less in left-wing press. By the same taken the proportion of practical and orientating knowledge was larger in left-wing than in right-wing papers.

We can conclude that entertaining knowledge dominates the mass communication about sport in Finland. The oversupply of entertaining knowledge means that the absolute and relative proportion of practical and

TABLE 3. Sport news reporting in daily newspapers (Vuolle 1978).

Content categories	Aamulehti		Turun Sanomat		Helsingin Sanomat	
	I	II	I	II	I	II
Entertaining knowledge	81	82	67	89	84	86
Practical knowledge	14	13	29	9	13	12
Orientating knowledge	5	5	4	2	3	2
%	100	100	100	100	100	100
Number of headlines	7106	11068	7050	10026	6929	12152
	Demari		Kansan Uutiset		Suomenmaa	
	I	II	I	II	I	II
Entertaining knowledge	59	85	66	72	97	97
Practical knowledge	33	15	29	20	3	2
Orientating knowledge	8	0	5	8	0	1
%	100	100	100	100	100	100
Number of headlines	1870	2781	3273	4910	1613	1838

I = normal period, II = period of ice-hockey world championship games

orientating knowledge is likely to become even less in the future. To this contribute the professional skills of sport reporters and editors and their professional orientation. Their generally recognized insufficient (theoretical) training leads to inability to deal with practical and orientating knowledge. Raising the educational level of sport reporters eg. by increasing their consciousness of being educators is one way in attempting to increase educationally biased material in mass media. Sport reporters are, however, only one link in the chain of knowledge communication. Similar demands can and should be set on different levels of the communication process: knowledge producers, communicators and target audiences. At all these levels there should be growing awareness of the general social interest in the development and guidance of mass media as defined in the Unesco statement.

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Lauri Laakso & Matti Rimpelä & Risto Telama

RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND SOME OTHER HEALTH HABITS AMONG FINNISH YOUTH *)

XXIIth International Congress of ICHPER, Kiel, FRG, 23.-28.7.1979

1. INTRODUCTION

It is a special feature of physical activity, in comparison with several other leisure-time activities, that a certain extent of physical activity is assumed to be conducive to health. A fairly large part of adults with an active personal interest in physical exercise also report their interest to be due to health reasons (see eg. Vuolle et al. 1979). Physical activity can, therefore, be seen as a part of people's health habits. Several studies of adult population have shown that physical activity is in some way related to other forms of healthy living, especially less smoking (see eg. Battegay & Mühlemann 1974; Biener 1970; Harris & Guten 1979; Kannas 1977; Steele & McBroom 1978; Williams & Wechsler 1972).

There have been only few studies of the relationships between different health habits among young people, and consequently we do not know at what stage healthy life habits are formed, if they are - in fact - interrelated. The investigation into the relationship between physical activity and other health habits is of interest in Finland, also for the reason that physical education and health education have been combined in the educational system so that P.E. teachers are mainly responsible for health education.

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*) Juvenile Health Habit Study

Another main aspect of the present investigation has been the study of how participation in the activities of sport clubs is related to health habits. Young athletes are given quite a lot of information about healthy life habits in general, for instance, about food and smoking. It is, therefore, interesting to find out whether active young members of sport clubs have healthier habits than those young people whose physical activity takes place outside sport clubs.

Third, it was studied what changes occur in the relations between physical activity and health habits with age. This study does not allow causal inferences but the follow-up design makes it possible to see whether changes in health habits are interrelated or take place independent of each other.

2. METHODS

The data were collected as part of a larger project called Juvenile Health Habit Study based on a mail questionnaires in February 1977 and September 1977. The questionnaire was mailed to a nationwide sample representing 11-18 year old Finns. The rate of response was 88 % in February (N=2831) and 79 % in September.

Questions related to physical activity dealt with participation in the training and competitions organized by sport clubs, participation in extracurricular sport at school, participation in the sport activities of other organizations as well as unorganized activity on one's own initiative. From these was derived a new variable to describe total physical activity during leisure time.

Other health habits studied were smoking, use of alcohol, dental care, and use of sweets and sugar.

3. RESULTS

3.1. Relationship between physical activity and other health habits

The young people included in the sample were first divided into three groups on the basis of their physical activity:

- active (participation at least 4 times per week)
- moderately active (participation 1-3 times per week)
- passive (participation less than once per week).

The health habits of these three groups were compared with each other. In regard of smoking the physically passive group stood out clearly from the other two groups. The number of non-smokers was lowest and that of daily smokers highest among boys and girls at all age levels in that group (Table 1). On the other hand the active and moderately active group did not differ from each other with respect to smoking.

Similar differences were found in the use of alcohol. The number of abstainers was lowest and that of regular consumers highest in the physically inactive group. As regular consumers of alcohol have been counted those using it at least once a week (Table 1). There was some difference between the moderately active and active groups in the use of alcohol such that there were more total abstainers and fewer regular consumers of alcohol in the physically active group.

There were only slight differences in the use of sugar. In the girls' group there was, however, a slight tendency for physically inactive girls to use sugar more than other girls. Clear differences in the brushing of teeth were found only among boys but the differences between girls were in the same direction - physically passive youngsters used the toothbrush less frequently (Table 1).

3.2. Participation in sport club activities in relation to health habits

In order to study the significance of participation in the activities of sport clubs the physically active group was divided into two sub-groups: those who participate actively in sport club functions and those who are physically active but outside the sport club programmes. The same division was made in the moderately active group.

TABLE 1. Smoking, use of alcohol, use of sugar and dental care in relation to physical activity.

	GIRLS							
	12-14 y				16-18 y			
	Passive (n=116)	Moderate (n=278)	Active (n=282)	p	Passive (n=190)	Moderate (n=307)	Active (n=155)	p
No smoking	28	60	56	<.001	16	23	26	ns.
Daily smoking	22	7	4	<.001	44	24	23	<.001
No use of alcohol	40	65	65	<.001	13	16	21	<.01
Weekly use of alcohol	10	5	3		24	16	9	
No use of sugar	10	20	18	<.05	32	41	48	<.01
Daily teeth brushing	81	85	87	ns.	87	94	95	ns.
	BOYS							
	(n=56)	(n=192)	(n=439)	p	(n=158)	(n=282)	(n=256)	
No smoking	38	35	45	ns.	13	16	21	ns.
Daily smoking	16	7	5	<.05	49	30	29	<.001
No use of alcohol	53	56	69	<.01	12	15	20	<.01
Weekly use of alcohol	10	4	2		32	25	17	
No use of sugar	13	8	9	ns.	13	16	12	ns.
Daily teeth brushing	44	57	53	ns.	49	65	65	<.01

Only slight and unsystematic differences were found in the health habits if thus formed groups. The only significant difference was found in the moderately active boys' group, aged 16-18, in daily smoking. There were more daily smokers among sport club members than among outsiders (Table 2).

TABLE 2. Number of daily smokers among sport club actives and others (boys).

	Physically very active boys			
	12-14 y		16-18 y	
	Activities in sport club (n=202)	Activities outside club (n=237)	In sport club (n=119)	Outside sport club (n=137)
Daily smoking (%)	3	5	25	32
p	ns.		ns.	

	Physically moderate active boys			
	12-14 y		16-18 y	
	Activities in sport club (n=62)	Activities outside club (n=130)	In sport club (n=71)	Outside sport club (n=211)
Daily smoking (%)	5	8	39	27
p	ns.		<.05	

3.3. Change of physical activity in relation to change of health habits

Besides a cross-sectional analysis, it was possible to study the relationship between physical activity and other health habits over a short follow-up period. In this analysis the young people were divided into four groups on the basis of their physical activity: 1) those who had stayed physically active from February to September, 2) those who had changed from passive to active, 3) those who had changed from active to passive, and 4) those who had remained passive. Starting of smoking was less common among the group which had remained physically active, but differences between the other groups were less clear-cut. The results suggest that the differences regarding smoking among physically active and passive are more or less established even among 12-14 year-olds. Passivity and changes in physical activity

(also in the positive direction) may be related to changes in health habits, but there was no increase of differences, at least over the 6-month period (Table 3).

TABLE 3. The relation between changes in physical activity and beginning daily smoking between February and September.

Change in physical activity	Beginning daily smoking (%)			
	Girls		Boys	
	12-14 y	16-18 y	12-14 y	16-18 y
Passive - passive	11	10	4	11
Active - passive	4	9	7	15
Passive - active	4	10	13	17
Active - active	3	6	3	5

4. DISCUSSION

The purpose of the study was to find out how physical activity is related to other health habits.

The obtained results indicated quite clearly that physical inactivity in youth is one definite symptom of unhealthy life-style and is often associated with the use of alcohol and smoking.

Participation in sport club activities did not appear to increase the number of young people with healthy habits in comparison with those who are physically active on their own, outside sport club programmes. Sport club participation does not, then, give "special immunity" against smoking or the consumption of alcohol, even if it is possible that sport clubs may be able to activate also such youth who otherwise might be physically inactive. Those who take part in sport club activities are probably more sociable and are more involved in healthy as well as unhealthy social functions compared with those who are physically active on their own, and this may even out the difference that may arise on account of the health information given at sport clubs. The result may also be partly due to differences in motives. Those who participate in sport clubs activities do so more frequently for reasons of social contacts and aspiration for success in sport (eg. Silvennoinen 1979), whereas those who are physically active on their own may have a strong health motive, which means that different forms of health habits are obviously interrelated.

This investigation does not permit inferences about causal links between different health habits. The follow-up design makes it possible, however, to analyse if changes in health habits coincide. The follow-up period of six months proved, however, too short for that purpose, since the obtained results were unsystematic when changes in physical activity were compared with changes in health habits. Young people may be at quite different developmental level at the same chronological age, and this obviously affects changes over a six month period. On the other hand, it is true that a distinct relationship between physical inactivity and other unhealthy life habits was found in the group of 12-14 year-olds, which may indicate that something decisive has taken place even before that age. If differences are, in fact, stable after the age of 12, it is necessary to study younger age groups in the future.

Another follow-up measurement was carried out two years later (winter 1979) but the results are not available yet. On the basis of the new data it will be possible to study in more detail whether changes in young people's physical activity are related to concurrent changes in other health habits. When to this data are added about social and personal variables, it will hopefully be possible to get useful information also for practical work in health education.

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4. SOCIALIZATION INTO THE SPORT INVOLVEMENT

In 1971 International Committee for the Sociology of Sport initiated a cross-national study of the socialization process pertaining to sport roles, with the University of Waterloo as the co-ordinating centre. The major objectives of the Leisure Role Socialization project are as follows:

1. To determine the degree of socialization into sport involvement.
2. To explain the process of socialization into sport involvement, as it applies to:
   a. the elite athlete
   b. the general population.
3. To determine whether the degree of socialization differs crossnationally.
4. To determine whether the process of socialization differs crossnationally.

Twelve countries have agreed to participate. Finland has participated into the project only partially. The Finnish research data concerning the elite athletes has been gathered using a questionnaire corresponding exactly to the instructions of international LRS project. The questionnaire was sent in 1975 to 117 track and field athletes of the Finnish national team and 108 Division I Finnish baseball players. These sports were selected to serve the purposes of the international study so that one represented an internationally widely spread sport culture and the other was representative of a typically national sport culture (in this case the Finnish variety of baseball).

For financial reasons the Finnish general population data in this project has been gathered one year earlier than in other countries. That is why the general population data is not internationally comparable. A random sample of 400 subjects were drawn from the young adults living in the town of Jyväskylä. In the first stage they were asked about their sport activities by means of a mailed questionnaire and in the second stage they were interviewed personally. By and large the method was same as used in the international study. The socializing agents investigated are childhood home, school, friends, mass communication and residential factors.

Lauri Laakso

THE RELATIONSHIP BETWEEN SOCIALIZATION ENVIRONMENT AND SPORT MOTIVES IN ADULTHOOD

Fifth European Congress for Sports Psychology, FEPSAC, Varna, Bulgaria, 17.-21.9.1979

1. INTRODUCTION

One of the most important things in attempts to activate people into active sport involvement is knowledge about what are the motives that make people go in for physical exercise.

It is, however, also important to know the mechanisms that at this moment determine whether people develop a permanent motivation for physical activity or not.

The starting-point of this motivation study has been a conception about a close connection between activity, consciousness and motive (Leontev 1977, Petrovsky 1973). The starting-point of a person's activity are needs, which may give rise to different acts, and the same act may also satisfy different needs. Motives change and develop through activity and of central importance from the point of view of permanent motivation is the internalization of the objective of activity. Consciousness occupies a prominant position in internalization.

The development of a permanent motivation for some personal interest is not only an internal process guided by needs, activity and consciousness, but also a social learning process. In social interaction the person gets stimuli which also guide the development

of motivation for physical activity. In accordance with the principles of social learning the stimuli are not only direct, external reinforcement, but, imitation, in particular (Bandura & Walters 1964, Bandura 1965), features prominently in the development of motivation for personal activity interests. Factors that have a central impact on social learning in childhood and early youth are socialization agencies, home, school and peer group, but in the case of motivation for physical activity also mass communication and sport organization are important (eg. Kenyon & McPherson 1973, Wohl & Pudelkiewicz 1971).

The purpose of this study is to explore how the socializing factors of childhood and early youth are related to motivation for physical activity in adulthood. The study is a part of a larger research program which analyzes the physical activity interests and motivation of the Finnish people[1)].

2. METHODS

The subjects of the study were 600 persons employed for a period of 10 or more years by the town of Jyväskylä in Central Finland, representing all urban occupational levels. The group is non-selected in terms of physical and sport activities.

The data were collected by a two-stage questionnaire-interview method. In the first stage the subjects filled in a mailed questionnaire. In the second stage, which is important for this study, a personal interview was carried out in which a retrospective method was used to clarify what the childhood and youth periods were like and what the subject's motives for physical activity were at the moment. In the motive interview the subject was first asked why he or she takes part in his/her favourite sports. This was followed by a number of elaborative

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1) The purpose of this study of the physical activity and sport behaviour of Finns is to clarify the physical activity of Finnish adults and their motives for physical activity. The study is carried out as a joint effort of the Department of Physical Education of Jyväskylä University and the Research Institute of Physical Culture and Health. The members of the research team are Lauri Laakso, Risto Telama and Pauli Vuolle.

questions whose purpose was to explore the exact meaning content of motives and to look for possible motive chains. The interviewee was also asked to state the motives for two most intensively practised forms of physical activity (Vuolle et al. 1979). For comparison purposes the subject was also asked to assess his or her motivation for physical activity in general using the structured scale constructed by Kenyon (1971).

3 RESULTS

In the first stage were computed the correlations between variables describing socialization environments and structured motive replies (Kenyon 1971). Those predictor variables that were related to motive variables at least at the one percent level of significance were included in the step-wise regression analysis.

The degree of relationship turned out to be rather weak, however (Tables 1 and 2). In the group of women those whose home background

TABLE 1. Relationship between socialization environments and sport motives in adulthood. Regression analysis: women.

	228 ascetic experience	r
241 sport involvement of siblings	.17	.19
244 father's encouragement	.16	.18
$100 \times r^2$		6.0 %
	229 pursuit of vertigo	r
241 competitive sport in youth	.15	.15
$100 \times r^2$		2.3 %
	230 aesthetic experience	r
257 sport involvement of friends	.19	.19
$100 \times r^2$		3.6 %

TABLE 2. Relationship between socialization enviroments and sport motives in adulthood. Regression analysis: men.

	224 social experience r
244 Father's encouragement	.26 .26
263 friends' encouragement	.20 .20
$100 \times r^2$	10.7 %

had been physically active, whose sisters and brotehrs had been eager participants in sport and physical activity and whose father, especially, had encouraged the children to take up physical activity, were actively involved in physical exercise as an ascetic experience. Those women who had been involved in competitive sport in their youth enjoyed even at a later age the speed and excitement associated with sport. Those whose friends were physically active looked for aesthetic experiences in sport and physical activity more than others.

In the men's group the only significant relationships were found between the encouragement by father and friends and social motivation for physical activity. Those whom father and friends had encouraged to take part in sport and physical activities regarded meeting friends as an important motive for practising sport and other physical exercise.

The association between unstructured motive replies and socialization variables was studied by means of cross-tabulation. Among women the physically active way of life of siblings and youth-time fiends was most clearly related to motivation for physical activity in adulthood. Those whose brothers and sisters had had active sport involvement took part in sport and other physical exercise more often than others because of the recreation and relaxation it brings. Furthermore, more often than others they reported that they had acquired a habit of physical exercise so that physical activity was an integral part of their way of life. Those whose brothers and sisters had been physically active had relatively more often a particular interest in some specific sports or an instrumental reason for their physical activity (eg. cycling to work).

Those whom friends had encouraged to take up physical exercise did it for reasons of health and fitness or because it had become a habit. Conversely, recreation and relaxation was relatively more seldom their motive for physical exercise.

In men's group only the encouragement of friends was related to motive replies. Those who had been encouraged by friends to take part in sport and physical activities had ascetic and sport-form-specific reasons, while those whose friends did not encourage such activity had acquired physical activity as a habit.

4. DISCUSSION

The purpose of the study reported here was to find out how socialization factors are related to motives for physical activity in adulthood. The degree of relationship turned out to be rather weak, f.ex. in regression analyses the socialization variables explained not more than 10 % of the total variance of the dependent variables, but the relationships were quite logical. It is obvious that experiences of physical activity in childhood and youth are important from the point of view of motivation for physical activity in adult age. The study was, however, only concerned with the directioning of motivation and not at all with its intensity. In studies of socialization for sport involvement (Kenyon et al. 1977) it has been found that socialization variables correlate more strongly with involvement in adulthood than with motives in the present study. If sport involvement is regarded as an indirect measure of the strength of motivation, the result would suggest that socialization variables explain the strength of motivation better than their quality. The results of this study point out clearly, however, that socialization factors are also related to the quality of motivation.

It should, however, be stressed that variables indicative of childhood and youth experiences have been measured retrospectively. For this reason we cannot be certain whether the relationship has been formed entirely through the influence of socializing factors on the development of motivation or whether motivation is reflected in the images that the respondent has of his/her period of childhood and youth.

Athough we cannot be certain about causal relations in using such a method, it is useful to know the connection between environmental factors and motives. On account of individual differences, people's sport involvement may be based on very different motives and the tentative results obtained in the present study give some indications about the kind of environmental factors that can create good conditions for the development of certain motives for physical activity.

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5. HEALTH SURVEY 78 including follow-up of the METELI project

The Health Survey 78 contains new subprojects and follow-up of the METELI programme. The purpose of the METELI project has been the description of employees in three metal plants in terms of working conditions, state of health and physical activity and, further, the mapping out of their interrelations and associations with certain individual and social factors. The research proper was conducted in 1973-78.

The Health Survey 78 is carried out in 1978-1980. It is a joint project of the Department of Public Health, University of Tampere, and the departments of Psychology, Public Health, Physical Education and Biology of Physical Activity, University of Jyväskylä with the Research Institute of Physical Culture and Health.

Data of the follow-up dates from the beginning of 1978. Results of individual health examination were prepared for sending to all subjects in November 1978. Data (n=748) was gathered using questionnaire, interviews, clinical examinations, physiological measurements and biochemical determinations.

The Department of Public Health of the University of Tampere is responsible for the project "Psychological strain, morbidity and health habits: a 5-year follow-up study". The main objective of the investigation is to determine the degree to which the indicators of stress on the central nervous system, found in the subjects studied in 1973, predict morbidity during the following five years. General long-term illness, coronary heart disease, hypertension, and musculoskeletal disorders are being given special attention. In the study of health habits, especially smoking habits and the use of alcohol and medication are being focused on. The development of and changes in physical activity will be studied separately, as will the development of mental well-being and changes in its influencing factors.

In its portion of the follow-up, the Research Institute of Physical Culture and Health is directing its attention towards physical activity, the ergonomic characteristics of the work conditions, and the determination of the relationships between the different indicators of the development of health status. In addition, an attempt will be made to establish the degree to which the use of health care services is dependent on the quality and quantity of leisure-time physical activity.

The main funding of the Health Survey 78 comes from the Finnish Academy and the Ministry of Education.

6. RESEARCH PROJECT ON SPECIAL GROUPS: sports behavior and physical abilities in the handicapped

The research project on behavior and physical abilities in the handicapped started in 1973. The project includes three different studies, one about mentally retarded, one about blind and partially sighted people and one about people with different kinds of illness and disability. In these studies the sports behavior is considered from a functional and social point of view.

1. The study about mentally retarded includes mildly and moderately mentally retarded (age 11-17 years, IQ 30-70) from institutional and home care in Central Finland (N=77). The study is a six-year follow-up started in 1973. The aim is to study the development of physical fitness, psychomotor performance, adapted behavior and sports behavior in this group.

2. The study about blind and partially sighted people has focused on children aged 8-18 years (N=66) from a boarding school and on adults aged 16-50 years (N=75), all from Central Finland.

3. The study about people with different kinds of illness and disability was performed in connection with the research project on the population's sporting behavior.

The second and third studies deal with quantitative and qualitative aspects of sports behavior connected to leisure activities and rehabilitation.

This project is sponsored by the Ministry of Education and the Finnish Academy.

Ulla Lahtinen

PUBLICITY ON SPORTS AMONG THE BLIND AND ENLIGHTMENT OF THE GENERAL PUBLIC

International Symposium on Problems of Sports for the Blind, Belgrade, Yugoslavia, 17.-20.4.1979

1. INTRODUCTION

The subject of this paper brings up two important questions. Why is publicity on sports among the blind necessary, and why is enlightment of the general public on this point necessary?

Publicity on sports among the blind directs our attention to the problem of creating a permanent interest in active sports among all blind people. A physically active life has a sociological, cultural, educational and medical significance which is at least as great for the blind as for the sighted population. It is here especially to be pointed out the possibilities a physically active life offers the blind in the form of both social contacts and integration as well as general mobility.

To increase the interest in sports among the blind, we need information about the blind, about possibilities for sports and about publicity in order to plan relevant and successful actions. Next we will discuss what we need to know to create an interest in active sports among the blind. We have to realize very clearly that blind people are persons of different age and health with different personalities, experiences

and interests. It is important to know the degree of blindness, the age of becoming blind and the occurrence of other diseases and problems. This knowledge is necessary for the planning of safe, developing and interesting sport programs.

In this connection, we also present preliminary findings of two pilot studies on children and of one on adults who all are totally blind or partially sighted. These studies contribute to a larger research project on sports-related physical activity and behavior of the blind.

2. SPORT BEHAVIOR OF BLIND CHILDREN

Rousing someone's interest in sports presupposes information about his or her sport behavior. An interview study about sport behavior of 66 blind children aged 8-18 in a boarding school (Lahtinen & Mustonen 1978) shows some facts of interest in this connection.

The group studied consisted of 41 boys and 25 girls of which 48 were totally blind and 18 partially sighted. The school is a new boarding school with a total of 100 pupils. It has very good facilities and possibilities for sport both during and after school time. Of the group studied, 38 % liked the physical education in the school very much and 62 % liked it to some degree. No one answered not to like physical education at all. The girls seemed to like physical education even more than the boys, and the totally blind more than the partially sighted. When asked about their leisure time activities on school days most of the children mentioned listening to music (53 %), outdoor activities (33 %), studying (32 %), listening to the radio (24 %), being together with friends (23 %) and walking (18 %). Most of the girls (64 %) seemed to do a lot of walking, while the boys were interested in more vigorous physical activities (63 %). When asked how often they practice sports, 53 % told that they exercise 1-3 times a week and 45 % that they exercise more than 3 times a week. About 40 % practised sports with a high intensity resulting in breathlessness as well as sweating while 46% with only a very low intensity. The intensity was higher for the boys and they did a lot of running,

bicycling and swimming. The girls liked to walk around slowly. The totally blind were slightly less active and used a lower intensity in their activities than the partially sighted. In winter the children preferred skating, skiing, walking, bandy and downhill skiing and in summer swimming, walking, running and bicycling.

The passive sport interest was quite high. About 15 % of the pupils followed sport programs on the radio and TV regularly and about 50 % listened to the programs every now and then. About 20 % attended sport meets at their homesite and 40 % in their schooltown. Sports in the newspapers was followed regularly by 5 % and sporadically by 32 % of the pupils.

In the study of the blind school children we also asked which factors restricted their physical activities. In the schooltown the children complained of too few leisure-time instructors (39 %), lack of time in the evenings and weekends (27 %) and lack of interest in sports (26 %). At home the most serious restrictions were lack of company (42 %), equipment (21 %), interest (15 %) and facilities (12 %).

When we want to rouse someone's interest in sports it is important also to have knowledge on the family and the peer-group and their sport interest. It is also important to know, whether the blind have assisting company. One of the greatest problems is how to get to the sports facilities. In the study of blind school children we found that, at home, 58 % practiced sports with their sisters and brothers, 33 % with their parents and 21 % with friends. Fourty-six per cent of the whole group and 67 % of the totally blind never practised sports with friends not belonging to the family.

Another pilot study was carried through about physical activity with regard to the age of pupils (Lahtinen et al. 1978). In this study on 17 totally blind children aged 7-17 years physical activity was measured with a physical activity index based on interview and with pedometer. The blind children of this study spent more time on sports and got a higher physical activity index than the sighted children of the same age in an earlier study (Telama 1970). The explanation for this difference obviously is that the blind children lived in a boarding

school providing good facilities for sport and organized leisure time activities. In spite of the good possibilities for sport in the school the physical activity of these blind children declined with age in the same way as among the sighted children. We can state that blind children and adolescents need special arrangements and attention to support their physical activities in order to prevent the clear decrease in sport activities with age.

3. SPORT BEHAVIOR OF BLIND ADULTS

Sport behavior of the adults has received little attention. A pilot study on the sport behavior of the partially sighted and blind (N=75) aged 20-50 years in Central Fin nd has been carried through (Lahtinen & Virkamäki 1979). The data were collected by a questionnaire with both structured and unstructured questions. A family member or a neighbour assisted in interviewing and in filling out the questionnaire.

The group studied consisted of 46 men and 29 women. About a half of the group had family of their own. Fourty-two per cent were in work-life. Almost a half or the group was totally blind and the rest were partially sighted. (The white cane was used regularly by one third.) Twelve per cent of the subjects had become blind before one year of age.

The interest for physical activities was high. Nearly one half of the subjects practised some kind of sport in order to increase their physical fitness at least three times a week and 18 % did sport one to two times a week. About one third was considered to be physically very inactive. There were relatively more women than men among the inactive ones.

Sixty per cent of the studied used to go for a slow walk and almost 40 % for a fast walk once a day. Running at least once a week was done by 13 persons. Some used also to do gymnastics at home (19), swimming in winter (11), swimming in summer (19) and skiing (12) at least once a week.

Thirty two persons knew that there were organized sports for the blind in their town. Half of them participated at least once in two weeks. Most of the regular participants were totally blind and young of age.

The passive sport interest was slightly higher among the men than among the women. About one third of the men listened to sports news on the radio and TV regularly, and 20% followed sports in the newspapers. Sports was the subject for discussion often for 32 % and sometimes for 55 %.

The ability to move around alone is important for independent sports-related behavior. This ability is usually reached by only a very small number of the blind. Of the group studied about 20 % told that they could not walk around at all or only very badly in their familiar physical environment outdoors. For almost two thirds it was impossible to move around in an unfamiliar environment. These results show the great need of assisting company for most of the blind. However, about 40 % moved around well in a familiar and 9 % in a nonfamiliar physical environment.

All those who had family performed sport activities with family members by 42 %. Only five of the blind used to go walking with sighted persons not belonging to the family. This fact shows that we are far from any large scale integration in this area. Almost half of the group studied used to do their sport activities alone.

About 52 % of the group studied estimated that they were not enough physically active. As reasons for this they mentioned disabilities other than blindness, no interest, lack of assistance or company, lack of organized and guided physical activities and lack of time.

Most of those practising sport at least once a week shared the opinion that sport is important for the prevention of diseases and, further, it brings relaxation and enjoyment. Additionally, the totally blind pointed out the values of social contacts and developing the ability to move around.

4. PUBLICITY AMONG THE BLIND AND ENLIGHTMENT OF THE PUBLIC

We also have to critically consider the kind of publicity in the physical activity of the blind. Most of the publicity seems to deal with competitive sports results and appeal mostly to people with good physical fitness and to athletes. More information and publicity is needed about the general benefits of sports for the blind and about the concrete opportunities for sports. However, this effectually reaches mainly those who are really interested in sports as yet. As the main problems still remain that it is difficult to have assistance and troublesome to get to the sports facilities. Other problems include the fear of not being successful in the sports activities and the lack of proper sportwear and equipment. It is to be suggested to experiment with transportation to the sports facilities and more teaching and guidance of elementary sport skills as well as with helping in having equipment. (These aspects and measures have been scrutinized at a recent meeting of the Finnish Central Organization for the Blind.)

We have now discussed sports behavior and characteristics of the blind as a basis to understanding what we can do to help the blind to a physically active life. The most serious problems are, however, not to be found in the blind themselves. They lie in people's attitudes, which have to change before we can speak of an integration in any field as a whole. Information about the need, possibilities, benefits and the problems of physical activity and sport for the blind and for other disabled has to be directed both to planners, designers, decision makers and to the general public.

The biggest problem is how to make the planners and decision makers really understand that planning the environment in terms of physically active life for the blind, other disabled, children and the aged makes it much better for everybody. This is a problem of education, but also a problem of personal contact and experience. One possibility of giving the planners and decision makers experience of and understanding for these things is to invite them to participate in different physical activities with the blind and to go walking with the blind in different parts of the city and so on. In addition we have some good experiences of discussions with the decision makers about environmental problems

of sports facilities. In these discussions it has also come out that the decision makers and planners just think of a small group of blind athletes. The reason seems to be that the newspapers, radio and television mostly produce news about results of competitive sports for the blind. Very seldom are there articles or programs on physical activities, needs and problems of all the blind.

Many of the problems mentioned above can also be found in the information meant for the general public. Competitive sport of the blind has received some attention in mass media and this is a good thing. But more information to the general public is needed about the problems of all blind people in getting around and being physically active. This way and through personal contacts it should be possible to change the attitudes of the general public.

Much work has already been done and the opportunities for sports of the blind have improved. But progress leading to real integration presupposes considerable change of our attitudes to all kinds of deviation. We have to learn to accept variation and to see similarities within variation. The person with a unique personality, with needs and rights is what we should have in our minds when we make plans and decisions and when we are in contact with each other.

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Ulla Lahtinen & Marja Saavalainen

THE DEVELOPMENT OF PHYSICAL FITNESS AND PSYCHOMOTOR PERFORMANCE IN MENTALLY RETARDED YOUNGSTERS: A SIX-YEAR FOLLOW-UP STUDY

Second International Symposium on Adapted Physical Activity, Brussels, Belgium, 13.-16.11.1979

1. INTRODUCTION

Home care services for the mentally retarded are being planned and improved in Finland as in most other countries. A new law about the care and services for the mentally retarded in Finland was introduced in 1978. The law stresses the importance of the development of the educational services and of rehabilitation for all mentally retarded. The main aim of the law and of the care of the retarded is to help them to an independent and sensible life in the community. The ability to work and to use one's leisure time in a meaningful way are important as much for the mentally retarded as for other people in community adjustment. This requires a certain level of physical fitness and psychomotor ability. There is a lack of information about the change of these qualities in the mentally retarded young in different environmental conditions.

This paper deals with the description of some preliminary data of a six-year follow-up study of mildly and moderately mentally retarded girls and boys undergoing institutional and home care in the Province of Central Finland. The aim of the study was to investigate the development of physical fitness, psychomotor performance, adapted behavior and leisure time activities in mentally retarded youngsters. The investigation was begun in 1973. Results from the 1973 study were presented at the

First International Symposium of Adapted Physical Activity in Québec, Canada, 1977 (Lahtinen 1978). The follow-up was conducted in 1979.

2. SUBJECTS

In 1973 the investigation focused on 11- to 16-year-old mentally retarded (IQ 30-70: TML, WISC) girls and boys undergoing institutional and home care from Central Finland. Eighty-two per cent (N=77) of this population were tested. The group did not include mentally retarded with physical disabilities and difficult psychotic symptoms.

In 1979 it proved possible to reinvestigate 95 % (N=74) of the group studied. The subjects were 17 to 23 years old at that time. Three of the subjects had died during the follow-up period.

3. METHODS

In selecting tests for measuring physical and psychomotor performance in 1973 attention was paid to factors related to job performance, health and leisure time activities. The nature of work in sheltered workshops for the mentally retarded was also considered. In 1979 the test battery was reduced from 22 to nine tests. A description of the initial tests was given at the 1st I.S.A.P.A. Symposium 1977 (Lahtinen 1978).

In the follow-up study the physical fitness tests included a 300 meter run for measuring running endurance and a sit-up for measuring dynamic muscle strength. Psychomotor performance measures included tests of walking on balance boards and standing on one foot for measuring dynamic and static balance, a test of piling boxes for measuring gross coordination and throwing balls for measuring the coordination of hand and eye as well as throwing accuracy. Three tests measuring different components of manual skill were also included: moving small beads, putting the cup on ball-point pens and twisting a bottle cap.

Adapted behavior was measured by a structured questionnaire checked by an interview based on a modification of a scale for adapted behavior (Nihira et al. 1968). Leisure time and work activities were measured by a check list and a focused interview. An interview was also used

for obtaining information about the home and work situation and about some other environmental factors. The personnel at the institution and day-care centre who had known the subject for the longest time was interviewed. With regard to subjects spending the day at home or at a place other than in a day-centre or the institution, one of the parents was interviewed (usually the mother). The mentally retarded themselves were also interviewed about leisure time activities and friends. Information about educational training, work and other activities, as well as about health and use of medicaments during the six-year period was taken from the patient records at the central institution for mentally retarded in the area. The information was checked and when necessary made more accurate in the interview. All the interviews were tape recorded. The tests and the interviews were performed in the day-centres and in the institution.

This paper describes mainly the environmental situation and the activities of the retarded in the follow-up study. Preliminary results of the change of physical fitness and psychomotor performance are also included.

4. RESULTS

4.1. Environmental and social situation, activities

4.1.1. Environmental conditions

Care-environment When this study was started 43 % of the subjects (N=77) were in the institution and the rest were undergoing home care. Six years later only 24 % of the subjects (N=74) were in the institution. Of those in home care almost 60 % attended day-centres, about one third were mainly at home, three of the subjects were in special schools, one worked in a sheltered workshop and one was in normal job.

Altogether, 57 % of the subjects who were in the institution in 1973 had been able to leave the institution during the follow-up period. The main reason was the opening of six new day-centres in the community. Many of the retarded youngsters had gone to the institution because of the lack of school and work possibilities in the community. When the day-centres developed they could move home again. Most of them seemed to be getting along well.

Many of the subjects still in the institution (18) were very institutionalized and they were expected to have great difficulties in adapting to the community. This was also seen with five subjects who tried to live outside the institution. They did not manage and had to return to the institution.

Home About 80 % of the subjects in the community lived in the countryside. More than one third of them lived several kilometres from the nearest neighbour. This situation, which is typical for many people in the countryside in most parts of Finland, is important to bear in mind when discussing possibilities for leisure activities.

The importance of the home and the people there becomes very great for the development of the individual when living far from a town or village. Nearly 70 % of the subjects had both their parents alive. One fourth had only one living parent and eight per cent were without the support of either parent. Many of the parents were already 60-70 years old and retired. Most of the parents complained of some disease. The biggest problem was the future for their mentally retarded child.

Ana analysis of the attitude and behavior of the parents toward their mentally retarded children showed that almost one fourth of the parents had an over-protective attitude. A realistic and understanding attitude was found in about one third of the parents and a neglecting or demanding attitude in about 10 %. In one third the attitude could not be estimated because there was almost no contact with the home.

Most of the subjects had adult brothers and sisters who had already moved out of the home. Those who had brothers and sisters at home were reported to get along with them quite well. Most of them did not, however, have any interests, activities or friends in common.

Friends The importance of friends and contacts for one's development is often pointed out. For many of the subjects in this study it was very typical that there were no other young people of the same age in the neighbourhood. Having friends and becoming integrated with young people of the same age-group was, then, almost impossible for at least one third of the mentally retarded youngsters in the countryside. Even when looking at the whole group it becomes clear, however, that we cannot as yet talk about integration into a peer group of

normals. Only nine of the 74 subjects had some contact with normals of the same age. Seven of these had been in a special education class and had IQ of 60-70. Only two of the youngsters with an IQ below 60 had normal friends of same age. Even these two contacts were not normal friendships. One could be called therapeutic and in the other case the peers simply made fun of the mentally retarded youngsters.

The parents of the subjects stated in the interviews that the young people in the neighbourhood and the brothers and sisters "go their own way", "have their own interests and their own friends".

About one fourth of the subjects had friends in their grandparents or other middle-aged or elderly people, and 15 % in young children, mostly children of their brothers or sisters visiting at the weekends and in vacations. Very striking is the fact that so many of the subjects in the institution (61 %), in the day-centres (24 %) and of those mainly at home (44 %) were alone most of the time. Most of the subjects seemed to get along well with their peers in the institution and in the day-centre. Only a few of them were, however, good friends or met in the evenings and during weekends even in the institution and in the towns where the distances were no problem. Three of the girls had a boy-friend and one boy had a girlfriend.

4.1.2. Leisure time activities

Leisure time activities should be examined in relation to the environment and to the available or accessible possibilities.

Other than sports activities contained much time for setting the table, washing dishes, cleaning and doing other house-work after the workday of the subjects in the institution. House-work should not be regarded as leisure time activities, but when the subjects were asked about interests and leisure time activities, many of them mentioned cleaning and washing dishes. Many also stated that they liked these activities. In the institution there are many organized activities, clubs for music, the theatre, handicraft, and sports, where the subjects went once a week. It seemed that the subjects went to those clubs to which they were used to going. The motive was not very clear and the name of the activity did not always give an accurate picture about the things the subjects experienced there. (Some, for instance, went to the library regularly

once a week and borrowed books, but never took them out of their bags. Some went once a week to the discotheque in the institution, but never danced. It seemed to be important to have coffee or lemonade.) Very few acted independently and on their own initiative and therefore most of the subjects attended those clubs to which they were taken.

Most of the subjects in the institution spent much time watching television. Programmes for children, Finnish films and entertainment programmes were the most popular. Many also watched TV, whatever was on. Another very typical activity was listening to popular dance music from their own tape recorder and from the radio. Almost everyone had learned to use a tape recorder and to change cassettes for it. The weekends are always problematic in institutions. These subjects also spent a lot of time doing nothing the weekends.

For the subjects living at home there were almost no organized regular leisure time activities due to the distance problems. There were clubs in only a few places. Most of the subjects spent their time at home with their parents. They spent a tremendous amount of time watching TV and listening to music from their tape recorders. They also read in and looked at popular magazines. There were very few who did something more active and with friends. Only three of the subjects had visited normal dances. During the weekends some visited relatives with their parents or met their brothers and sisters and their children. It was also typical that the parents had no special leisure time activities.

The provincial association for mentally retarded arranges camps, trips to theatres, churches, and sight-seeing trips about twice a year. Most of the subjects had participated in these trips and they seemed to be effective means of breaking isolation and making contacts both for the parents and the retarded.

Sports activities in leisure time were mostly restricted to walking. In the institution different kinds of regular sports programmes, gymnastics, swimming, skiing, cycling, etc., are organized, in which more than half of the subjects (N=18) had participated. The most typical sports activity was, however, a fairly slow walk in a group once a day for about two kilometres both in the institution and in the day-centres.

Only one of the boys belonged to a sports club for normals, which he used to go to with his brothers.

An analysis of the physical activities of the subjects during the follow-up period showed that ten of the boys and none of the girls had been so active physically that it could have an effect on their physical fitness. Most of the subjects were very inactive.

One reason and result of the low physical activity can probably be found in the big overweight problem in this group. Nearly 40 % of the subjects were more than 20% overweight when compared to their ideal weight (Döbeln 1956). According to the subjective evaluation of the personnel and the parents as many as 45 % of the subjects had weight problems.

The control of eating and dieting seemed to be especially difficult at home. Only in two cases (N=56) had there been success. In some homes the problem was that parents took different attitudes to weight control and some parents tried to avoid bad temper by giving good food. Some parents said "what else can I do for him, he likes eating well". Some of the subjects bought candy themselves.

In the institution it was much easier to set strict diets and there was more often success as far as control is concerned than at home. Even in the institution there were problems, however, because some of the subjects took food from other wards, from the kitchen and other places without permission.

4.1.3. Work activities

The subjects were 17-23 years old when the follow-up study was conducted, and so most of them were in working age. Twelve per cent were, however, still at school. Of the subjects in the institution 61 % were working, of those in day-centres 82 % and of those at home 39 %. Most of the subjects in the institution had undertaken wood- and metalwork and most of those in day-centres had carried out handicraft work, some of the subjects mainly at home had undertaken housework and farmwork. About one fourth of all subjects were at home doing practically nothing.

Most of the subjects in the institution and in the day-centres received a weekly wage which corresponded to a one hour wage in normal work. About half of the subjects cared about the salary and only a few complained that it was too low. Praise and compliments for good work were mostly used as motivational means in the institution and in the day-centres. Some of the subjects worked better when they knew the person who was going to buy their work.

During the interviews it was found that the personnel both in the institution and in the day-centres had different and very unclear opinions about the goals of the work-training and about the habilitation and the future of the subjects in general. One of the main reasons for this is probably the unemployment in many sections of Finnish society. Other problems arose from the fact that unprofitable work is not considered to be of value in the same way as profitable work. At the same time normalization and integration are expected making the situation confusing and somewhat controversial both for the personnel and for the parents. This situation is certainly also reflected in the work behavior of our mentally retarded people.

4.1.4. Adaptive behavior

An analysis of the adaptive behavior of the subjects showed that 70 % were independent in different activities of daily living such as eating, washing, dressing, etc. There was, however, a big variation on the success in adaptation to community services. Only 16 % could go independently to have something to eat in a coffee bar. About 10 % could go on a bus alone and 16 % could use a telephone independently. The subjects in the institution managed the activities of daily living better than those at home. They had also had more systematic training in these activities and there was not as much overprotection and helping as in the homes. Only 10 of the subjects could use some community services. They were all undergoing home care and had an IQ of 60-70. All the others needed help in travelling by bus, using a telephone, and in other like activities. This resulted probably from the fact that so many lived an isolated life in the countryside with very few possibilities for contact outside their own home. The inability to use community services independently means a big barrier to work and leisure activities especially for people living in isolation.

4.2. Physical fitness and psychomotor performance

The change in physical fitness and psychomotor performance was analyzed in relation to age, sex and IQ, to environmental conditions, and, further, to sports-related physical activity. The results presented are based on the t-test for correlated means and on analysis of covariance (Finn 1974).

Age, sex and IQ groups are considered first. All the three age groups of mentally retarded in this study (age in 1979: 17-18 years, 19-20 years, 21-23 years) got significantly better results in the gross coordination and dynamic muscle strength tests ($p<.001$) in the posttest compared to the pretest. Only the youngest subjects had improved significantly in manual skill and in static balance ($p<.01$). There was no significant change in running endurance or in dynamic balance in any age group. According to the analysis of covariance, there was, however, no significant difference in the change between the age groups.

There was no significant difference between girls and boys in the change in physical fitness and psychomotor ability, except in running endurance, where the girls had weakened their results compared to the boys ($p<.01$).

The subjects were compared in three groups according to IQ-level (IQ 30-40, 41-55, 56-70). All groups had improved significantly in gross coordination, muscle strength and manual skill ($p<.05$ - $.001$). In addition, both the groups of the moderately retarded had improved significantly in static balance. No significant difference between the groups based on covariance analysis could be found. The mentally retarded with mongol syndrome (N=19) had improved more in static balance and muscle strength than the others ($p<.05$) according to the covariance analysis.

Environmental conditions seemed to be related to the change in some components of physical fitness and psychomotor skill. The mentally retarded who had been in the institution or in the day-centres most of the six-year follow-up period improved significantly in gross coordination ($p<.001$) and muscle strength ($p<.01$). In addition, the subjects from the institution had improved in static balance ($p<.01$) and those from the day-centres in manual skill ($p<.01$). Those who had been at home most of the time had improved significantly in muscle strength ($p<.001$)

and gross coordination ($p<.05$). The analysis of covariance showed a significant difference between subjects from institutional and home care in manual skill and running endurance. The subjects from the institution had improved in running endurance and those from home care in manual skill.

Both those who had been in school and those who had been working during the follow-up period had improved in gross coordination and muscle strength ($p<.001$). In addition, the group who had been working had improved in static balance ($p<.01$).

Those who had not participated in, in spite of having attended situations for, regular daily physical activities had improved slightly only in gross coordination ($p<.05$). In the analysis of covariance there was a significant difference between the school group and the inactive group only in gross coordination.

Frequency of sports activity seemed, consequently, to have relevance for the change in physical fitness and psychomotor ability. Those who did some sports at least two times a week had improved significantly in all measures except in running endurance. Those who did sports less than once a month had imroved only in gross coordination and muscle strength. A significant difference between the physically inactive and active subjects was found for static balance ($p<.05$) and running endurance ($p<.01$) according to the analysis of covariance.

5. DISCUSSION

The results given in this paper are preliminary. A thorough discussion is not possible in the present phase. Some comments will, however, be made.

Measuring change in children of developmental age is problematic. As expected, it seemed that the younger and the moderately retarded had developed slightly more in physical fitness and in psychomotor performance compared to the older ones and to the mildly retarded. About one third of the subjects had weakened their results in running endurance during the follow-up period. Possible reasons for this could be that

so many had put on body weight during the period and that so many had been very inactive physically. The physical fitness of the subjects was already in the initial study on a significantly lower level compared to normal youngsters of the same age. A further weakening of the physical fitness with increased age stresses the need of appropriately organized regular sports activities.

More than half of the subjects had clearly developed in gross coordination and manual skill. This is probably a result of both general development and successful training. Further analysis might give a more clear picture of the relationships. It should, anyway, be noticed that also many subjects from the oldest age group performed better than at the beginning of the study six years ago. This result could mean that a development of the psychomotor abilities of the retarded is still going on in the age range of 16-22 years.

On the basis of both the preliminary results and the experience of the investigator and interview during the study it can be stated that the subjects who are in home care need special attendance. An intensification of the development of the home care, which also is going on, seems necessary. The parents need more support in the education and activation of their retarded children. There is also a need of more day-centres of more personnel and of more education of the personnel. The program in the day-centres should include daily physical activities, also others than walking. More leisure activities could possibly be arranged in day-time in the centres and in the close community, at least for the retarded living far from the towns.

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Research Institute of Physical Culture and Health

INFORMATION SERVICE: secondary documentation & information

The Information Service of the Research Institute of Physical Culture and Health was established on the initiative of the Ministry of Education in 1971. At present it functions in the library building of the University of Jyväskylä, has full access to library holdings, but does not belong to the administration of the university. The Jyväskylä University Library is the central library for psychology, behavioral sciences and sport sciences in Finland. However, one of the main tasks of the Information Service of the Research Institute is to take care of scientific information in sport sciences and physical education.

The functions of the Information Service are mainly structured according to national weigh points in sport sciences as set by a state body, and also on-going research projects are taken account of. Its functions can be grouped as follows.

1. Internal activity within the Institute, which is connected with the work of the Institute staff and, partly, that of researchers and teachers in the Faculty of Physical Education of the University. 2. National activity, which can include editing the report series of the Institute, publication exchange, editing three annual publications (bibliography of Finnish literature in sport sciences and physical education, selected abstracts of research reports, yearbook of the Institute), literature reviews in press, data documentation to some extent, research register, individual literature searches, contributions to publishing activity of some other bodies and teaching of the use of information sources in sport sciences and physical education. 3. International activity, which is mainly carried out allied with the functions of the International Association for Sports Information (ICSPE). 4. Service activity, which is connected with access to publications. At times, activities are rather closely related with certain on-going research projects or project planning. Selected and directed literature searches, publishing of own newsletters and registration of research are the central activities.

Emphasis is laid on behavioral and social sciences within the dimensions of sports sciences. Quite many biomedical questions are intermediated to the national central library in medicine.

The staff of the Information Service is two persons permanently. Their work is mainly directed to researchers, teachers and advanced students. Other students are guided by the library personnel. However, there is a close co-operation between the staff of the Information Service, Research Institute and the University Library. Consequently, we can say that the size of the Information Service's staff is potentially noticeably more than two persons in everyday work.

The Information Service of the Institute differs from some other Finnish institutes which handle secondary scientific information. The University Library provides collective services for all students and also for teachers and researchers to a great extent, whereas the services of the Information Service of the Institute are more individual, selected and provided for more strictly defined target groups, like for the personnel of a certain research team. Another major institute or organization is the Finnish Society for Research in Sports and Physical Education, which is resident in Helsinki. It also provides mainly collective services like seminars on certain current topics and includes seminar reports in its publication series. It does not carry out systematic registration of research or selected literature searches as such, although it is a channel of state funds for some documentation and information outputs of some other institutes, e.g. the Information Service of the Research Institute.
At present, the Information Service of the Research Institute of Physical Culture and Health is the only national, broad-scale scientific information body, which mainly deals with secondary information, for sports sciences. Its international functions and possibilities are based on the structure of national activity of the Information Service.

The most important international relations belong to the activity of the International Association for Sports Information and, more specifically, to its working commission "Kommission Informationsmittel". The Informatic Service also follows the development of the European Inventory of on-going research projects by the Council of Europe. This section of registering on-going research is carried out in the same lines as the work in educational sciences by the Institute for Educational Research in Jyväskylä. Otherwise, the tasks belong to the coordinative functions of the Society for Research in Sports and Physical Education.

For the development of the Information Service we can distinguish certain sectors for the future. It is important, that 1) the present storage for and editing of continuous secondary sources is established on solid basis with a "standard" bulk of resources. This concerns the annual publications of the bibliography, abstract collection and the Institute's yearbook as well as individual, special secondary documents. There is a principle that a special, large bibliography/abstract collection should be published in the report series of the Institute each year. These mainly collective services recur often in the same form and need the same activities yearly. When this sector is "stabilized", more flexibility could be provided for individual services. This would promote for increasing selective dissemination of information and, further, ADB services. Automatic literature searches have been mostly off-line during the 70's. Now on-line searches can be executed with the terminal at the Jyväskylä University Library to the data bases available in the Lockheed and the SDC systems. Some experiments are made with the data bases through the SCANNET system, which also serves for a Nordic project of information retrieval in behavioral sciences and psychology, including sports sciences and physical education when applicable. The on-line connections are based on current contracts. Other links are potential and under planning. Especially in biomedical aspects of sports sciences, traditional off-line bases are prolifically exploited. (There is no national data base specifically to sports sciences. These are included into the national bibliography on magnetic tape from 1978. Retrospective storage has strongly been upon consideration.)

It is also important, that 2) the availability of foreign literature (monographs, serials, "shadow literature") is wide. This is the basis for knowledge for research produced in other countries, and its prerequisites lie in the acquisition and holding policy of the national central library in Jyväskylä.

And it is, further, important that 3) flexibility and adaptation of information connections whether on official basis of nets or more informal links are guaranteed. This is essential because of the distinct multidisciplinary nature of sports sciences in general and, implicatively in international interaction, because of the young heritage of these sciences in Finland as well as in most other countries.

1. FOLLOW-UP STUDY ON THE PHYSICAL PERFORMANCE CAPACITY OF YOUNG MEN

The background for the study is in the growing interest in physical performance capacity, physical activity and physical education of the youth, for instance, because of the changes in life with technological production. It has also been suggested that the physical performance capacity of Finnish youth has deteriorated during the last few years, although we have not any follow-up studies on this subject.

Because of the lack of follow-up studies in this field, the Research Unit has conducted a study on the effects of detachment from "obligatory" physical education like school P.E. and the period of conscription.

The measurements of the present on-going research have been made during the year of 1979 as a 2-years follow-up for the measurements of the conscription period 1976-1977. The purpose has been to declare what kind of changes has occurred in physical performance capacity and in leisure-time physical activity interests of young men during the years close after conscription. Random sampling was used for the subjects (N=58), who had their conscription in two garnisons: Keuruu (N=28) and Mikkeli (N=30). They are all born in 1956. The timing of the follow-up measurements is as accurately as possible the same as that of the time of entering military service (Keuruu in June, Mikkeli in October). The measurements are also performed by the same personnel and the blood analyses by the same laboratory as in the earlier phases of the study.

Measurements were done in aerobic capacity ($\dot{V}O_{2max}$, Cooper test), in muscular power (1min all-out ergometer ride) and also in anthropometric measures (height, weight, body fat %, LBM, FFW, BMI). Indicators of the state of health included blood pressure and blood analyses (Hb, Hcr, La, S-cholesterol, S-Fe, TIBC). The leisure-time physical activity was examined by questionnaires.

The preliminary findings show that there have been not so great changes in the two years after the conscription on the group level. However, some changes on the individual level are considerably great, and they are explained by the increase in body weight in most cases. The frequency of

leisure-time physical activity has clearly diminished especially regarding winter time as compared to the period preceding the conscription period. On the other hand, leisure-time physical activity has enlarged in quantity when compared to the conscription period.

The results of the study can be exploited in the evaluation of policy measures in leisure-time physical activity and health. Especially this concerns the promotional measures taken for the male young adults in the phase of their life when they get detached from obligatory sports-related and health education (institutions of school, army).

The study is financed by the Ministry of Education and the Scientific Committee of National Defense.

2. FOLLOW-UP STUDY ON THE EFFECTS OF ONE-YEAR PAUSE GYMNASTICS ON PHYSICAL FITNESS AND SCHOOL ALERTNESS OF 13- TO 18-YEAR-OLD PUPILS

The purpose of the study is to declear the effects of one-year pause gymnastics (5 minutes exercise break) on the physical behavior, physical fitness and school alertness of comprehensive school pupils. Experiences concerning the execution of exercise breaks are also gathered. On the basis of the results the usefulness of this kind of physical activity for school physical education and school work is estimated.

The study is carried out at one urban school and at one rural school. The study was begun in August 1979 and the exercise breaks are carried out every schoolday during one school year. At both schools there are two experiment classes (which have both exercise breaks and obligatory physical education) and two control classes (which have only obligatory physical education). About half of the pupils are 13-years-old boys and girls, the rest 16-years-old boys and girls.

The physical behavior of the pupils is studied by questionnares, the physical fitness by motor fitness and laboratory tests and the school alertness by psychological tests. All the tests are repeated three times during the study.

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DAILY PAUSE GYMNASTICS AS A NEW METHOD FOR IMPROVEMENT THE EFFICIENCY OF PHYSICAL EDUCATION

International Conference on Physical Training and Sport, AIESEP, Split, Yugoslavia, 25.-30.9.1979

1. INTRODUCTION

The importance of physical activity and exercise in the harmonious development and education of children and youth has been pointed out even by high policy and decision-making levels (UNESCO 1976). Concurrent experiments to upgrade physical education within the school system have been mainly concerned with clarifying the fitness effects of extra physical education lessons. The results of these experiments (Anyzewski 1972; Johnson 1969; Kemper et al. 1978; Rieckert et al. 1976) have partly been contradictory indicating that in the development of physical education in schools we should not be concerned only with the amount of lessons but also with the contents of lessons as well as with the methods of teaching (Kuklys 1974). For instance, it has been shown that pupils' heart rates in physical education lessons are often too low to effect any improvement in fitness (Goode & Watt 1974; Knowles 1978).
At the same time - because of the acceleration of technological development - the creation of cognitive capacities has become more important in education (UNESCO 1972). The teachers also have conflicting views about the relative importance and meaning of different school subjects. Due to both of these things, it is not easy in the future to obtain more physical education lessons in the timetable of the school. Therefore, to reach the goals set for school physical education means that P.E. teachers have to look for new ways and methods

in their work. One possibility is to organize exercise breaks or daily pause gymnastics in schools. This kind of experimentation, which takes only a few minutes, has been suggested in the First International Conference of Ministers and Senior Officials responsible for Physical Education and Sport (UNESCO 1976).

The following paper reports on the effects of a 10-week of daily pause gymnastics on pupils' physical behavior, motor fitness and aerobic capacity. The program was conducted as a pilot study within one of the on-going research projects of the Research Unit for Sport and Physical Fitness, Jyväskylä.

2. PROBLEMS

The purpose of the study was to decleare the effects of a 10-week of daily pause gymnastics on pupils'

1. physical behavior:
   - frequency of physical exercise
   - intensity of physical exercise
   - subjective estimation of physical fitness
   - attitude towards school physical education
2. motor fitness:
   - muscle power
   - flexibility
   - agility
3. aerobic capacity:
   - maximal oxygen uptake, predicted ($\dot{V}O_2\text{-max}_p$)
   - physical fitness index

3. METHODS

The experiment was carried out in normal school conditions between October and December in 1978 in a comprehensive school of Jyväskylä. The subjects were sixth-grade pupils in two classes of the same school. One class (14 girls and 15 boys) served as the experimental group and the other class (14 girls and 12 boys) as the control group. Data on the anthropometric characteristics of the groups are presented in Table 1. All boys were taught by the same male P.E. teacher (3 weekly lessons), and all the girls were taught by the same female P.E. teacher (3 weekly lessons).

TABLE 1. Anthropometric characteristics of the experiment (E) and control (C) groups at the beginning of the study ($\bar{X}\pm S.D.$).

Variable	E	C
Age (years)	12.2 ± 0.3	12.3 ± 0.3
Height (cm)	154.7 ± 8.2	152.1 ± 7.8
Weight (kg)	47.1 ± 14.1	42.5 ± 8.2
% F	20.3 ± 9.0	20.0 ± 6.6
LBM (kg)	36.8 ± 7.2	33.7 ± 5.3

Daily pause gymnastics for the experimental group was arranged during ten weeks on each schoolday beginning at 11.57 and lasting five minutes. This means that the time spent on pause gymnastics was partly taken from the end of a lesson and partly from the beginning of the normal pause between lessons. The period was organized and it was conducted by the same teacher in the classroom each time.

The pause gymnastics period consisted of three parts: 1. warming-up (duration 45-60 secs), 2. program proper (duration 3 mins), and 3. winding-up (duration 45-60 secs). The program proper, which was varied daily, consisted of three parts of varying contents: a) flexibility program which consisted of various bendings, and stretchings, b) endurance program which consisted of different sets of walking and skipping tasks, c) muscle power program, which mainly consisted of one-leg jumps. Data on the pupils' physical behavior were obtained by means of a questionnaire which was given in the classroom. For the measurements of motor fitness the following tests recommended by I.C.S.P.F.T. (Larson 1974) were used: a) muscle power: flexed-arm-hang, 30-sec sit-ups, standing long jump; b) flexibility: trunk forward flexion (sitting) and c) agility: shuttle run speed.

As the indicators of aerobic capacity were used maximal oxygen uptake assessed on the basis of three loads and corresponding heart rates and known maximal heart rate (Lange Andersen et al. 1971) and the physical fitness index (Vuori et al. 1969) calculated on the basis of the same loading. Every measurement before and after the program was carried out on the same weekday and at the same time of the day.

One-way analysis of covariance was used to find out the effects of pause gymnastics. On account of the fact that the number of subjects was small and the study was a pilot sudy the results were not broken down by sex.

4. RESULTS AND DISCUSSION

The frequency and the intensity of physical exercise, which are perhaps the most important variables of physical behavior, were not influenced by means of pause gymnastics. The result on frequency is explained by the fact that a majority of both experimental group pupils (62 %) and control group pupils (73 %) practised before the experiment physical exercise at least twice a week, which is often considered the minimum amount for keeping up physical fitness (American College of Sport Medicine 1978). The result on intensity is due to the fact that the large majority (96 %) in experimental and 88 % in control group of the pupils carried out physical exercise which resulted in some or considerable breathlesness and sweating. It is, however, possible, that daily pause gymnastics may influence the type of physical exercise. In fact more than half (55 %) of experimental pupils reported that they had carried out pause gymnastics movements also at home. From the point of view of physical education the observation is interesting since gymnastics is not popular among pupils at least in Finland (Silvennoinen 1978). The smallness of the experimental group does not, however, allow a more detailed analysis of this finding.

During the experiment the amount of those pupils who would participate in school physical education on voluntary basis in reased by 21 % in the experimental group (Figure 1). Respective increase (23 %) was found also in the amount of those pupils who thought that the current amount of P.E. lessons was too low (Figure 2). No similar changes were found in the control group. The results suggest that daily pause gymnastics had made the pupils' attitudes towards physical education more positive. This view is supported by the fact that these initial measurements results in both variables agree with the results obtained in the larger Finnish data (Silvennoinen 1978). Further studies are needed to explain whether exercise break has similar effects on alertness in other school subjects.

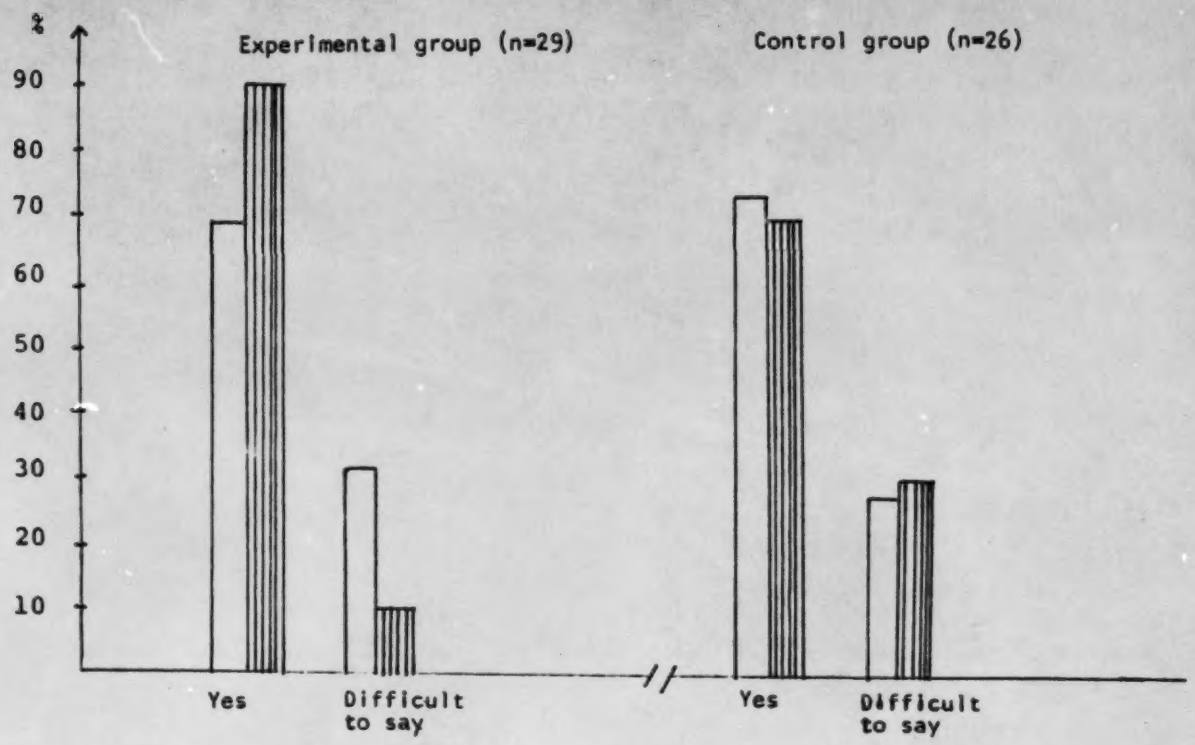

FIGURE 1. Willingness (in percentage) to participate in school physical education on voluntary basis in the experimental and control group before (white column) and after (dack column) the pause gymnastics period.

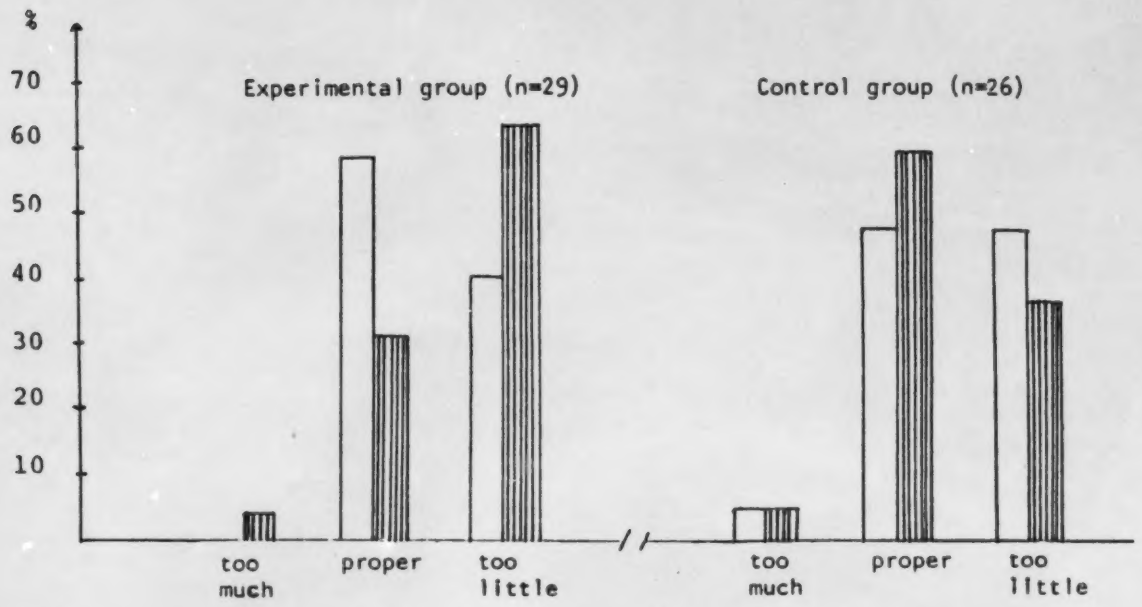

FIGURE 2. Experimental and control pupils' views (in percentage) about the number of physical education lessons before (white column) and after (dack column) the pause gymnastics period.

The results of motor fitness tests (Table 2) indicated that a daily pause gymnastic period had a significant effect only on trunk forward flexion ($p<.05$). The results suggest that it also had some effect on shuttle run speed ($p<.10$). As regards these two findings it has to be noted that in fact the experimental group reached the same level as the control group in the final measurements while lagging, on the average, 5 % behind them in the initial measurements. The difference in the anthropometric characteristics of the groups explained this result (Table 1) at least in part. In any case the results indicate that the effect of pause gymnastics on the pupils' motor fitness can, in the first place, be seen as an increase in flexibility and in the second place as an increase in agility. From the point of view of physical

TABLE 2. Results of motor fitness and aerobic capacity before and after the program in experiemtnal (E) and control (C) groups, gain in percentage, as well as comparison between experimental and control group by means of one-way analysis of covariance.

Test	Group	Before $\bar{X} \pm$ S.D	After $\bar{X} \pm$ S.D	Gain in %	One-way analysis of covariance F	p
Motor fitness						
Flexed arm hang (sec)	E	12.3 11.5	15.1 13.7	17	1.12	n.s.
	C	14.8 15.8	19.2 17.8	20		
30-sec-sit-ups	E	17.1 5.2	17.6 5.0	3	0.22	n.s.
	C	19.6 4.4	19.8 3.6	1		
Standing long jump (cm)	E	172.5 21.0	173.9 20.0	1	0.24	n.s.
	C	175.9 23.8	177.4 20.0	1		
Trunk forward flexion (cm)	E	53.3 8.4	57.8 7.8	8	4.39	<.05
	C	56.8 7.7	58.7 7.6	3		
Shutlle run (sec)	E	14.0 1.4	13.0 1.1	7	3.31	<.10
	C	13.3 0.9	13.0 0.9	2		
Aerobic capacity						
$\dot{V}O_2$-max ($ml \cdot kg^{-1} \cdot min^{-1}$)	E	35.7 8.2	40.5 8.9	13	0.76	n.s.
	C	34.6 5.0	40.9 6.9	18		
Physical fitness index	E	78.4 24.5	99.1 34.5	26	0.29	n.s.
	C	74.8 18.6	92.0 25.8	23		

education the development of these characteristics is important because at the same time we improve the pupils' capacity to carry out physical activity requiring skill. Particularly in puberty, when there is great variation in the body size of pupils, pause gymnastic programs may even out some of the differences in pupils' motor fitness and thereby promote the attainment of the objectives of physical education.

Daily pause gymnastics periods were not found to increase pupils' aerobic capacity (Table 2). The result is in line with earlier findings according to which 5 minutes of low intensity (heart rate after different gymnastic periods varied between 133 ± 18 and 161 ± 19 beats·min^{-1}) loading does not increase the aerobic capacity of 12-year-olds (Goode et al. 1978, Knowles 1978).

Although the experiment was not found to have a measurable effect on physical endurance or muscle power, subjective estimates of experimental pupils concerning endurance and muscle power increased significantly ($p<.05$) during the experimental period.

The results suggest that the daily pause dymnastic period has led the experimental pupils (perhaps especially those pupils who are only slightly involved in physical exercise) to overestimate the real effects of the pause gymnastic periods on their physical fitness. This view is supported by the fact that there was a significant correlation ($r=.54$, $p<.01$) between the experimental pupils' subjective estimate of endurance and $\forall O_2\text{-max}_p$ while the correlation was -.19 in the final measurement. The corresponding correlations in the control group were .49 ($p<.01$) and .61 ($p<.001$). On the other hand these results show that pupils of this age do not have a clear idea about how long and how intensively they have to practise physical exercise in order to improve endurance.

The correlations between subjective estimate of muscle power and flexed arm hang remained unchanges during the research period both in the experimental group (.34 and .33, n.s.) and in the control group (.65 and .63, $p<.001$). The result shows that experimental pupils, in particular. have had difficulties in estimating their muscle power exactly.

At the beginning of the study a large majority of both experimental pupils (86 %) and control pupils (88 %) reported that they would gladly take part in daily pause gymnastics if it were arranged. The results were similar in the final measurement. in addition to which 90 % of experimental pupils reported that they had willingly or very willingly taken part in the pause gymnastic periods during the whole period of the experiment.

The results of the experiment can be summarized as follows:

1) Pause gymnastics in schools may make pupils' attitude towards physical education more positive and thereby it may increase physical activity over a longer period of time.
2) It is possible to develop some areas of pupils motor fitness through pause gymnastics but not their aerobic capacity, at least over a short period.
3) Pause gymnastics may lead pupils to overestimate their physical fitness.
4) Pupils would like to participate and do participate willingly in pause gymnastics, and in practice it is possible to organize such an activity in schools without great investments.

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EFFECTS OF PAUSE GYMNASTICS ON PUPILS' PSYCHIC ALERTNESS

Fifth European Congress for Sports Psychology, FEPSAC, Varna, Bulgaria, 17.-21.9.1979

1. INTRODUCTION

Pause gymanstics is arranged in many countries for employees who are working in conditions where the organism is subjected to one-sided and/or harmful loading. In part for the same reason, it has been suggested recently that pause gymnastics should be tried out also in the school (Aho 1977, 1978; UNESCO 1976) since school work is mainly sedentary and rather exhaustive mentally. However, before decisions are taken about a largescale introduction of pause gymnastics into the school, it has to be studied whether such a new form of activity really has some positive effects on the pupils and on the school work. Hence a study has been initiated as a joint project in Jyväskylä, whose purpose it is to find out how daily short periods of physical activity influence the pupils' physical fitness, leisure time physical activity interests in spare time, and mental alertness. The study is started autumn 1979. In this report I will briefly describe the results of the pilot study carried out last year. I will limit the discussion to the effects of pause gymnastics on pupils' mental alertness.

2. PAUSE GYMNASTICS AND MENTAL ALERTNESS

By pause gymnastics is usually meant short periods of physical exercise inserted among work during which compensatory gymnastic movements are carried out. Mental alertness consists of two mutually complementary components, the intensity of mental performances and subjective feelings which are related to state of physical and mental health and work motivation.

To our knowledge, no experimental studies have been made about the effects of pause gymnastics on pupils' mental alertness. In the case of adults it has been found that physical activity is positively related eg. to vigour in setting out to work (Tiainen 1972), better work output (Gorbunov 1978), ability to concentrate and attentiveness (Kalmar & Nagykáldi 1978; Nagykáldi et al. 1978). It has also been observed that relaxing pause gymnastics periods are positively related to concentration and to performance requiring memory (Holdevici & Horghidan 1978) and conversely that a good physical condition is negatively related to mild symptoms of disturbed mental health (anxiety, depression) and to feelings of ill health (tiredness, dizziness, insomnia) (Telama 1978). Although the research results cannot be directly generalized to pupils, they provide the impetus for studying the psychic effects of physical activity in the school community, eg. because educational authorities are constantly searching for ways of reducing the passivity, exhaustion and restlessness among pupils. In the light of the studies among the adults, pause gymnastics is assumed to be helpful for pupils at least in the following three ways:

1. Physical exercise heightens the pupils' activation level which can be utilized in directing pupils' activity towards the goals of the school.
2. Physical exercise gives relaxation and therefore prevents milder symptoms of disturbed mental health such as anxiety, restlessness and tension.
3. Physical exercise increases physical fitness which in turn increases resistance to stress and prevents tiredness.

In the first two cases the effects of physical exercise can be either immediate or they may appear after a longer period of training. In the third instance the increase of mental alertness presupposes determined and extended physical training.

From the point of view of the pupils and schoolwork it is interesting to study both the immediate and long-term effects of pause gymnastics and therefore both aspects will be studied in our research project. In this paper I deal with long term effects in the light of a pilot study.

It was started on account of the positive results concerning the immediate effects of pause gymnastics. Two short experiments had shown that a five-minute period of pause gymnastics improved (with some exceptions) the pupils' mental alertness, when it was assessed with copying, memory and thinking tests requiring concentration and attentiveness (Tiainen et al. 1979). On the basis of this information our concrete research problem, of which a short summary will be presented in this paper, was to explore whether daily pause gymnastics over a period of ten weeks influences pupils' mental alertness.

3. RESEARCH METHODS

3.1. Subjects, research design and treatment

The experiment was carried out in normal school conditions between October and December in 1978. The subjects were sixth-grade pupils in two classes of the same comprehensive school. One class (14 girls and 15 boys) was the experimental group and the other class (14 girls and 12 boys) was the control group. The research design was a two-group prepost experiment desing.

Three kinds of programs were designed for pause gymnastic periods: flexibility and movement programs, endurance programs and muscle power programs. The programs were carried on successive days in the above-mentioned order. Daily pause gymnastic periods were organized during three weeks on each schoolday beginning at 11.57 and lasting five minutes. This means that the time spent on pause gymnastic periods was partly taken from the end of a lesson and from the beginning of the break. The pause gymnastic programs were planned by a research team and were carried out by a class-teacher.

3.2. Variables and measurements

Earlier studies have taken as indicators of mental alertness (a) cognitive performance measured by objective tests, ability to concentrate and/or attentiveness, and (b) subjectively assessed mental well-being such as work energy, sense of health and lack of psychosomatic symptoms.

In this report I will deal with mental alertness only in terms of cognitive performance. The choice of the objective tests measuring mental alertness was based on the premise that tests should represent those mental operations and subject-matter contents on the basis of which learning in school progresses and those work habits that the school aims at.

On the basis of some earlier studies the following tests were included in the study: Copying test (measures the repetition of a certain routine, accuracy and perceptual speed) and Memory test (short-term memory, ability to concentrate) from the Wechsler test battery (Weiss 1977) as well as a Thinking fluency test (productive thinking, ability to concentrate) adapted by Pitkänen and Tiainen (1973) from the Guilford's test battery. The tests measure rather elementary mental abilities. The purpose of easy tests was to elicit the potential effects of pause gymnastics instead of intelligence (in the more demanding sense). For the same purpose, only three tests were included in order to eliminate test fatigue.

Copying test: The subject has to copy simple figures corresponding to certain numbers. This is a test of perceptual speed and accuracy.

Memory test: The subject is required to repeat series of number symbols which requires attention and short-term memory. A low score may also reflect anxiety. The experimenter reads out six number series consisting of 4 to 6 numbers. Immediately after hearing the number series the subject is to write the numbers in the same order on a piece of paper. The score is the number of correctly remembered number series, the maximum score being six.

Thinking fluency test: This is a test of divergent thinking requiring concentration. The subject is required to write as many thoughts as possible about a given topic. The score is the amount of produced thoughts. The topic of the first test was "break" (play period) and in the second test "lunch-break".

The pre- and post-tests were carried out in the pupils' own classroom under the guidance on the same experimenters.

3.3. Methods of analysis

One-way analysis of covariance was used to find out the effects of pause gymnastics ANCOVA makes it possible to compare the post-test results of the experimental abd control groups by holding constant differences observed in the pre-test between the two groups.

Within the experimental and control groups the results concerning boys and girls were combined since the changes between the pre- and post-tests were in the same direction and of the same size among both sexes.

4. RESULTS AND DISCUSSION

The pupils in the experimental group improved their results significantly more than did the control group in the copying test requiring perceptual speed and accuracy ($p \leq .05$) and a similar trend was found in the memory test requiring concentration ($p \leq .10$). Both groups showed similar improvement in the thinking fluency test requiring concentration and creative thinking.

TABLE 1. Pre- and post-test scores of school alertness in the experimental group (GB_E) and control group (GB_C), gains in percentage, and comparison between the experimental and control groups by means of one-way analysis of covariance.

Test	Group	Pre-test $\bar{X} \pm$ S.D.	Post-test $\bar{X} \pm$ S.D.	ANCOVA F	ANCOVA $p \leq$	Gain in percentage
Copying test	GB_E	52.0 11.0	65.4 11.6	5.88	.05	26
	GB_C	54.0 11.6	61.9 13.5			15
Memory test	GB_E	8.9 2.2	10.0 1.5	3.45	.10	15
	GB_C	9.0 2.0	9.3 1.6			6
Thinking fluency test	GB_E	18.3 5.6	21.7 6.3	0.14		19
	GB_C	17.6 5.9	21.5 6.6			22

The result is congruent with out earlier observation about the immediate positive effect of pause gymnastics on the results of the copying test and in part also on the memory test (Tiainen et al. 1979). We can, then, conclude that pause gymnastics does have a positive effect at least on mental performance that requires accuracy and perceptual speed (copying test) and concentration (memory test). This pilot experiment does not make it possible, however, to say anything definite about the mechanism of this effect. We can hypothesize, however, that pause gymnastics as regylarly recurring daily activity teaches pupils to concentrate also in other similar situations (such as test situations). Also the decrease of psycho-somatic symptoms in the experimental group and their increase in the control group during the experimental period suggest that the capacity of pupils participating in pause gymnastics to cope with tasks requiring concentration and accuracy improved during the experiment. Further studies are needed to corroborate the results on a more representative sample representing several grade levels and using a variety of tests of cognitive performance.

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3. STUDY ON THE PHYSICAL PERFORMANCE CHARACTERISTICS OF THE FINNISH NATIONAL ICE-HOCKEY TEAM

The purpose of the study is to declear and to follow-up the physical performance characteristics of the Finnish elite ice-hockey players. The study was begun in utumn 1978 and it will go on at least until 1980. Every year the measurements are carried out twice. The players of the Finnish national ice-hockey team serve as subjects (n=27) for this study.

The following anthropometric parameters are measured: height, weight, the percentage amount of body fat and lean body mass.

The health status of the subjects is studied by the measurement of blood pressure and by the determination of hemoglobin and hematocrit.

In order to determine the maximum oxygen uptake and anaerobic threshold (4 mM) of the players, lung ventilation, oxygen consumption, heart rate and blood lactate concentration are measured during incremental bicycle ergometer test. The intensity of the exercise is increased every second minute up to exhaustion which occures after about 20 minutes.

The muscular power of the subjects is measured both by Margaria running test and by two one-minute all-out bicycle ergometer rides. The b.e. -rides are separated by 3 minutes recovery period.

The results of the study are applied to the training of the Finnish national ice-hockey team and to the other elite ice-hockey players of Finland.

The study is supported by grant from Finnish Ice Hockey Assosiation.

Markku Vainikka & Paavo Rahkila & Heikki Rusko

PHYSICAL PERFORMANCE CHARACTERISTICS OF THE FINNISH NATIONAL ICE-HOCKEY TEAM

International Symposium on Sport Biology, Vierumäki, Finland, 17.-19.10.1979

SUMMARY

The purpose of this study was to clarify the physical performance characteristics of the Finnish elite ice hockey players. 27 players of the national team served as subjects for this study. The team considered of 3 goaltenders, 8 defencemen and 16 forwards. The subjects had continuously played in the national team on the average 1.6 years before the measurements in August 1978.

The following anthropometric variables were determined: height, weight and the percentage amount of body fat (%F) (Durnin & Rahaman, Br.J.Nutr. 21, 681-689, 1967). In order to determine maximum oxygen uptake ($\dot{V}O_2max$) and anaerobic threshold (AT) an incremental bicycle ergometer test was performed. The intensity of the exercise was increased every second minute up to exhaustion which occured after about 20 minutes. Lung ventilation ($\dot{V}E$, STPD) and oxygen uptake ($\dot{V}O_2$, STPD) were measured continuously during the exercise using a semiautomated system. Blood samples for enzymatic analysis of the lactate concentration (LA) were taken from fingertips at the 6th, 10th, 14th, 18th minutes of exercise and again 0.5 and 2.5 minutes after the exhaustion. Heart rate (HR) was calculated from EKG registered every second minute.

The highest values of $\dot{V}O_2$, $\dot{V}E$, HR and LA during exercise were considereded maximum for each subject. The determination of the anaerobic threshold was carried out according to Rusko & Rahkila (Acta Physiol. Scand. 1980, in press) applying a 4 mM blood lactate threshold.

The vertical velocity of the subjects was measured by Margaria running test (J.Appl.Physiol. 21, 1661-1664, 1966). The muscular power of the subjects was measured as total amount of work during two one-minute all-out rides on a bicycle ergometer (Szögy & Cherebetiu, Eur. J. Appl. Physiol. 33, 171-176, 1974). The rides were separated by 3 minutes recovery period. Blood samples for the estimation of LA were taken 2.5 minutes after both b.e. rides.

The age of the players averaged 23.9 years (range 18.4-29.9 years). The weight of the subjects was 81.8 $\pm$ 6.0 kg and %F 13.0 $\pm$ 2.6.

At the end of the incremental b.e. exercise the subjects attained the maximum power of 296 W, HR of 187 beats $\cdot$ min^{-1}, $\dot{V}O_2$ max of 4.3 l $\cdot$ min^{-1} (52 ml $\cdot$ kg^{-1} $\cdot$ min^{-1}), $\dot{V}E$ of 119 liters $\cdot$ min^{-1} and LA of 12.1 mM, on the average. The anaerobic threshold was found at the mean power of 235 W (79 % of maximum) correspongind to HR of 162 beats $\cdot$ min^{-1} (76 % of HR max) and $\dot{V}O_2$ max correlated significantly ($r=.78$, $p<.001$) with $AT_{\dot{V}O_2}$, when $AT_{\dot{V}O_2}$ was expressed as percentages of $\dot{V}O_2$ max the correlation was not significant.

The mean vertical velocity of the subjects was 1.50 m $\cdot$ sec^{-1}. The total amount of work during the first one-minute all-out b.e.-ride was on the average 383 J $\cdot$ kg^{-1} and LA after the ride 13.8 mM. In the second ride the results were 326 J $\cdot$ kg^{-1} and 17.6 mM, respectively. No statistical differences were found between goaltenders. defencemen and forwards.

Based on the low $\dot{V}O_2$ max and AT of the players and on the high muscular power of the subjects it was concluded that more emphasis should be put on the training of the aerobic characteristics of the Finnish ice hockey players.

(The original paper will be published in the International Series on Sport Sciences, University Park Press, Baltimore, MD.)

4. EFFECTS OF INCREASED INTENSITY OR INCREASED QUANTITY OF ENDURANCE TRAINING ON PHYSIOLOGICAL CHARACTERISTICS OF YOUNG CROSS-COUNTRY SKIERS

Basic knowledge is to be acquired on the physiological effects of various endurance training methods. This is done for developing the quality of methods in sports training in Finland. The study is carried out jointly with the Department of Biology of Physical Activity, University of Jyväskylä, and the Research Unit for Sport and Physical Fitness.

The study is a 3-year follow-up, during which the subjects (young cross-country skiers and biathlonists) carry out their training according to the proposals by the researchers in the training periods of 1978, 1979 and 1980.

The subjects are grouped into four: the normally training (N=30), the quantitatively (distance-type) training (N=40), the intensively (interval-type) training (N=40) and the control group (N=25). The controls are adult skiers and biathlonists. The three other groups are young (14- to 20-years-old) skiers and biathlonists. The groups are training according to the ways required by the study during the basic training periods and, in 1980, also during the event-specific training (skiing) phase. During the competition period the groups are free to carry out their training in their own way.

Within the frame of the study, it has been possible to validate a new physiological test variable describing endurance performance capacity. This 'anaerobic threshold' indicates the intensity at which an athlete can exercise for prolonged time, e.g. Marathon run, cross-country skiing. This variable seems to reflect the oxidative capacity of muscles. The main variables of the study are the following: traditional maximal oxygen uptake, anaerobic threshold, oxidative and anaerobic capacity of muscle (percentage amount of slow-twitch fibres, of oxidative and glycolytic fibres activities of oxidative and glycolytic enzymes), heart volume (roentgenological), blood oxygen transport (Hb, Hcr, S-Fe, TIBC), maximal anaerobic performances, and anthropometric variables.

Results have been reported at trainign clinics for coaches organized by the Finnish Olympic Committee and the Finnish Skiing Association. Further results are presented in press (Acta Physiol Scand) and at symposia.

Heikki Rusko & Paavo Rahkila

MAXIMUM OXYGEN UPTAKE, ANAEROBIC THRESHOLD AND SKELETAL MUSCLE ENZYMES IN MALE ATHLETES

International Symposium on Sport Biology, Vierumäki, Finland, 17.-19.10.1979

ABSTRACT

Determinants of aerobic performance were studied in 75 male cross-country and biathlon skiers aged 18.4 years (range 12.2-29.7 years) in the spring of 1978 They belonged to the best skiers in Finland in their own age groups. Maximum oxygen uptake ($\dot{V}O_2max$) and anaerobic threshold (AT) was measured during incremental bicycle ergometer exercise using a semi-automated system for the mesurement of respiratory parameters. Percentage of slow twitch muscle fibres (%ST fibres), succinate dehydrogenase (SDH), malate dehydrogenase (MDH), citrate synthase (CS) and lactate dehydrogenase (LDH) were analyzed in muscle samples obtained from m. vastus lateralis. $\dot{V}O_2max$ of the subjects was 62 mk $\cdot$ kg^{-1} $\cdot$ min^{-1} and AT 49 ml $\cdot$ kg^{-1} $\cdot$ min^{-1} (79 % of $\dot{V}O_2max$ = %AT). When the effect of age was removed using partial correlation method $\dot{V}O_2max$ correlated significantly ($p<.001$) with AT in ml $\cdot$ kg^{-1} $\cdot$ min^{-1} (mlAT). The %ST fibres showed no significant correlation with $\dot{V}O_2max$, mlAT or %AT. Significant correlations were found between MDH and mlAT ($p<.01$) and SDH and %AT ($p<.05$). The sum of the z-scores of the three oxidative enzymes correlated significantly with mlAT ($p<.05$). $\dot{V}O_2max$ showed no significant correaltions with enzymes studied. It is suggested that oxidative capacity of muscle contributes slightly to anaerobic threshold but the contribution of other factors may be of equal importance.

(The original paper will be published in the International Series on Sport Sciences, University Park Press, Baltimore, MD.)

5. FOLLOW-UP STUDY OF PHYSICAL REHABILITATION OF SPINAL CORD INJURIED MEN

The aim is to study physical performance capacity of the spinal cord injuried men in different ISMG injury classes, effects of a 2- to 4-week physical exercise on physical capacity and durability of the results after rehabilitation. The study also concerns the influence of improved performance capacity on daily activities, activity interest and some health-related factors.

The population consists of 18- to 40-year-old men with traumatic spinal cord injury. The subjects of the study comprise all the persons (appr. 50-60) who attended the Rehabilitation and Motion Centre Peurunka for special charge during 1978-1979. The control data were drawn from the patient records on 30 spinal cord injuried men in the Rehabilitation Institute Käpylä. The experimental group participated in the rehabilitation program in Peurunka having physical exercise for 4 hours daily. The total program proceeded progressively by week and included exercises promoting for circulation system, muscle strength and motor coordination.

Physical performance capacity is measured at the beginning, mid-way and at the end of the 4-week rehabilitation period and, further, at both the 3rd month and the 1st year after the period. Measurements for the control group are done respectively, excluding only the mid-way measures. Physical performance capacity is determined by assessment of maximal oxygen uptake (direct method) in manual ergometer and motor-driven treadmill, Cooper-test ride, measurements of ventilation as well as of muscle strength (isometric, isotonic). Blood samples were taken for analyzing Hb, La, leucocytes, fat values, K, Ca, glucose, creatine, and urine samples for albumin, glucose, cells and bacteria. Questionnaires are directed for the state in work-life, educational background, use of medicaments as well as sedatives, urinary tract infections, prevalence of stress ulcers, physical activity habits and interest with regard to frequency and intensity. Questionnaire data are computed for correlations with factors of physical performance capacity.

Special follow-up measurements are to be carried out in autumn 1980. Results and completed reports will be produced at the end of the same year.

REPORTS OF PHYSICAL CULTURE AND HEALTH
1975 - 1979

Abstracts

* Physical Education of Preschool Children

NURMI, HELI & SIREN, HELENA, Alle kouluikäisten liikunta: kouluunmenoikäisten lasten motorisen kunnon ja perusliikunnan mittaus ja yhteyksien selvitys.
[The physical education of preschool children: measurement and explanation of relations in motor ability and field of basic movements of children of school age.]
Jyväskylä 1975. 69 p. Reports of Physical Culture and Health 4.

This is a preliminary report of a project on children of the ages of 3-6 years. The sample comprised 21 boys and 22 girls. The reliable variables for reflecting essential phases of change in the development of physical performance capacity were strength of body and arms, 40 m run, takeoff in jump, distance and target in throwing and the performance time in catching up and throwing a ball against wall. Then the developing of quality evaluations for basic movements was done, that would have had great importance for practical evaluation, only the evaluations of distance throwing were found out to be reliable.
Even in this small sample, the differences between children were distinct in each aspect. The variance in both of the two testing sessions was interpreted significantly (34-71%) with sex in distance throwing and target throwing and in long jump. Four factors were grouped in performance of girls and boys, of which the intensity of moving (jumping) and dexterity had the most constant context. The 3rd factor was loaded with different throwing and catching-up tasks and the 4th with body and arm strength in all and in agility running in boys.

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NURMI, HELI & SIREN-TIUSANEN, HELLNA, Alle kouluikäisten liikunta: ulkoliikuntaleikit kouluunmenoikäisten lasten perusliikunnan kehittäjinä: metodinen kokeilu.
[The physical education of preschool children: outdoor games as a means of developing the basic movements of children of school age: methodological experiment.]
Jyväskylä 1975. 42 p. Reports of Physical Culture and Health 12.

Research methods were used to experiment with ways of developing the early physical education tradition in Finland as far as it concerns outdoor games of the oldest age group in day-care centres. Games suitable for the entire age groups and developing basic motor skills were selected from classified games material. Eight of these were then tested for three weeks at a day-care centre. A pedagogical test was taken as the model of developing the research methods. Only indicatory results were obtained of the development potential of games. Important was the information obtained of knowledge of sport, the games children knew, and the conditions and reasons for taking part in them. Children's

physical activity was linked with their knowledge of games. They were only eager to join in games they could master well. The participation of a teacher increased the activeness and interest of all children to participate. The differences in motor development are great even by school age. Purposeful direction of sport and physical education and reforming of false habits are required. Social upbringing is important, for movement games have a rich and diverse potential. The inventing of various variations and additions to games should be encouraged.

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* Research on School Physical Education

NUPPONEN, HEIMO, Plan for a programme of research on school physical education in Finland in 1975-1979. Abridged version. Jyväskylä 1976. 61 p. Reports of Physical Culture and Health 14.

By the end of 1974 about 150 school physical education studies had been made in Finland. The number of studies has risen greatly in recent years, though there have been considerable annual variations. About 2/3 of the studies have been concerned with problems of implementation. There has been very little research into goals and planning, or into physical education for preschools, special and vocational schools. About 1/4 of academic theses have been concerned with physical education at school. The economic resources have not followed the growth in funds of research in physical education and sports. Of these funds, about 5 per cent have annually been spent on research into physical education at school. The researcher resources are also small.

The system for school sport activities is divided into two parts: separate examination of societal functions of school sport and its inner functions. Typological examination of the research tasks is made in the disportion of three classifications (object, time, implementation). Order of urgency and importance should be as follows: 1) functional-based and 2) goal-based research. The former is aimed at the significance of school sport from the point of view of individuals and society. The latter signifies research directed at measurement of goals, reasons, topicality and existing goals. In addition to these general principles, the important areas of research are defined as the study of 1) further development of goals, 2) physical performance capacity and 3) level of interest in sports-like physical activity. This is an English abridged version from the main report No. 7 (in Finnish), which has also been published in a Finnish abridged version, No. 8.

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NUPPONEN, HEIMO, Koululiikunnan oppisisällöt ja niiden käytön edellytykset. [Contents of school physical education and the conditions for their realization.]
Jyväskylä 1979. 83 p. Reports of Physical Culture and Health 25.

The weighting, variation and connections of the contents of P.E. were described as well as the relative effects of teachers, teaching groups and teaching conditions on the selection and use of teaching contents. The population consisted of the teaching groups in comprehensive and secondary schools in Finland in 1979. Stratified three-stage random sampling was used. After pilot studies the data were gathered through questionnaires to pupils and teachers. Nineteen sport events were distinguished and the sport types formed as a combination of them were, in the order of frequency, ball games, gymnastics and other gym work, basic movement of the track and field type, skating, orienteering, skiing and swimming. In addition to them came measurements and other contents. 90% of teaching time was devoted to contents prescribed in the current curriculum, but their weighting was uneven in groups for boys or girls. It also varied by the grade level, by type of school and region. Teachers' characteristics, training and experience explained the distribution of teaching contents clearly. Male teachers gave clearly more time to their own preferred forms of sport than did female teachers. The preferences of the teaching group proved important. The role of teaching conditions was significant in general. The functional objectives of the school are the principal criteria for the systematic realization of physical education. More varied teaching contents are needed.

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SILVENNOINEN, MARTTI, 7-9 -vuotiaiden lasten fyysisesti aktiivit harhasteet vapaa-ajan toiminnallisuudessa ja käsitykset koululiikunnasta. [Physically active interests of 7-9-year-olds in the totality of leisure-time activities and their views of physical education at school.]
Jyväskylä 1979. 71 p. Reports of Physical Culture and Health 26.

The interview study with pupils from grades 1 and 3 was carried out in November 1978. Data were gathered from 346 pupils in 12 different municipalities. Sixty-seven per cent of boys and half of girls belonged to a closely-knit, single-sex group. There were only very few children without friends to play with in the yard. The frequency of outdoor activities is typical of children living in the countryside. Sports-related activities are most typical with 9-year-old boys living in urban environment and having lots of friends. Typical spare time activities among girls are various chores indoors and participation in hobby clubs. Differences in activity by the type of domicile are also fairly clear-cut. Children, as girls in general, in the countryside take part in imaginative, manipulative and role games more often than town children. The contents and quantity of physical activity are clearly determined by sex, place of residence and social environment. Positive views of school physical education are most commonly expressed 9-year-old boys belonging to a coherent group and relatively least frequently by girls in urban environments who also have few friends to play with.

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NUPPONEN, HEIMO & TELAMA, RISTO & TÖYLI, VELI-MATTI, Koulun kuntotestistö.
[Fitness test for schools.]
Jyväskylä 1977. 85 p. + test cards.
Reports of Physical Culture and Health 19.

The fitness test book for schools is a product of the research project on school physical education carried out in the Research Institute of Physical Culture and Health. The book concerns evaluation system for physical fitness and presents a measurement method of fitness. The test battery is based on tests constructed by the International Committee for standardization of physical fitness tests. It can be applied to those of 6 to 32 year of age and also to both sexes. This book presents the norm scores for 10 to 18 year-old ones, and the tests are consequently recommended to be used not earlier than in the age of 10 to 11 or at the 3rd and 4th grade levels in schools. It is especially emphasized, that tests can be chosen in different amount depending on time, facilities, equipment and on the need for exactness in various cases.
The book is foremost designed for physical education teachers in various schools. It can also be applied for the functions of sport organizations, physical fitness clubs and individual persons.

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* Population's Sporting Behavior

KIVIAHO, PEKKA, Sport and intracultural social change: a longitudinal analysis.
Jyväskylä 1976. 38 p. Reports of Physical Culture and Health 13.

The economical and social changes of advanced countries have affected the development and growth of sport federations for the past fifty years. The report focuses on the ways in which changes in the development of organized sport reflect politico-structural changes in society and what factors are linked with them. Finland is regarded as a good concern of research, because of the differentiation of sport movement after the civil war in 1919 and the enormous growth of sport federations support after the World War II. The main target federations are the Finnish Central Sport Federation and the Workers' Sport Federation. Social cleavages between the working and bourgeois classes, between ethnic groups (Finnish and Swedish speaking populations) and different socio-economic factors have affected the development and growth of federations both quantitatively and qualitatively. Changes in the support for the Central Federation is more dependent on general socio-economic conditions, whereas the support of the Workers' Federation with its closer leftist and labour movement ties is more closely and directly connected with factors affecting the position of workers in society or their internal organizations. In spite of many levelling factors, the connections are reflected in the development conditions of the two organizations even during the period after the World War II. However, there are differences in the explanation of support during the pre-war period and post-war period. During the present and more stable political and social situation, the effect of political factors has been in a way institutionalized.

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LAHTINEN, ULLA & MUSTONEN, PÄIVI, UOSUKAINEN, LEA, Kehitysvammaisten toimintakykyisyys ja fyysisen harjoituksen vaikutus - katsaus alan tutkimuksiin sekä ehdotuksia liikuntatoiminnan kehittämiseksi.
[Physical performance capacity of the developmentally retarded and the effects of physical training - A review of subject studies and proposals for improvement of functions concerning sports and related activities.]
Jyväskylä 1979. 60, (43) p. Reports of Physical Culture and Health 23.

Studies on the developmentally retarded have been increased in number in various countries. However, reliable knowledge of the whole subject field is still lacking, because there has been too little research on some subfields. This review focuses on the mentally retarded with lagging psychic, physical and social development. The main focus is the physical development and motorics, in which there are less distinguished deviations than in other individual properties and which can be improved noticeably with training. The review covers studies on the mentally retarded in school age and the youth mainly from 1960 onwards. Greates amount of studies have been published in the USA. Scandinavian countries have been concentrated on physical fitness and its training effects whereas the German area represents studies on motor ability especially. Current concepts are partly confusing, which has also made rather difficult to classify and evaluate the mapped studies.

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* METELI-PROJECT

METELI. Kolmen metallitehtaan henkilöstöjen elinolot ja elämäntapa.
[METELI. The general life conditions and mode of living of employees in the machine industry.]
Jyväskylä 1975. 182 p. Reports of Physical Culture and Health 1.

In this report the groupings and recruitment of the employees according to the division of work in the factories are described. Of the living conditions outside work, data of the following fields are studied: a) the distributions of salary, b) consumers' goods and c) quality of housing as well as d) the system of everyday behavior encompassed by the concept "mode of living" (family, home chores, leisure activities). A general conclusion is that those who are better situated occupationally (more education, better working environment and nature of work) are better also with respect to their life conditions outside work (more economic resources, higher housing standards, more extensive and richer modes of leisure activities). - A starting point for the investigation was the view that work is a primary factor in forming the quality of life for man, and that the effects of division of work within the industrial organization extend to life conditions outside work.

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METELI. Työympäristöt metallitehtaissa: pölyn, melun, tehollisen lämpötilan ja valaistusvoimakkuuksien jakaumat sekä niiden vaihtelut kolmessa konepajateollisuuden tehtaassa.
[METELI. Working environments in the machine industry: the distribution and variations of silica dust, noise, effective temperature and illumination in three plants of the machine industry.]
Jyväskylä 1975. 157 p. Reports of Physical Culture and Health 2.

The population of the study comprised all the individual workplaces in three plants of the machine industry. A sample of 320 elements was obtained from the population by a proportionate stratified systematic selection. Several measurements of industrial environment factors were made in the workplaces included in the sample. Seasonal variation of observations was described and analysed by classifying observations according to the stage of production. The results showed that the majority of the workers in the plants concerned work in environments which cause psychophysical stress. The handicaps measured in terms of different environmental variables are the greater the closer we get to the early stage of the production chain.

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METELI. Työolot metallitehtaissa: työn luonteen ja työympäristöjen piirteitä kolmessa konepajateollisuuden tehtaassa.
[METELI. Working conditions: the character of work and working environments in three plants of the machine industry.]
Jyväskylä 1975. 179 p. Reports of Physical Culture and Health 3.

The general aim was to describe the working conditions of the employees in machine industry, work load, stress, and satisfaction at work. The results showed that the character of work and several related factors concerning load, stress and overall comfort are consistently determined by a person's position in the work process so that the working conditions were generally speaking more loading, stress symptoms more common and the comfort of the working conditions lesser at the early stages of production process than among persons employed in planning and administrative tasks or in office work in general. The physical loading of work was the most significant characteristic of work that causes stress and reduces comfort and satisfaction. In addition, the inadequate compatibility between work requirements and personal abilities was a significant factor causing dissatisfaction with working conditions.

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METELI. Congress reports 1974.
1. Telama, Risto, Physical activity and sport in the leisure time of employees of the machine industry in Finland: a preliminary report. P. 1-19.
2. Kirjonen, Juhani, Sport and physical capacity for work. P. 21-48.

Jyväskylä 1975. 48 p. Reports of Physical Culture and Health 5.

Telama. Risto. Physical activity and sport in the leisure time of employees of the machine industry in Finland. - The purpose of the present study was to make a comprehensive analysis of the role of various forms of physical activity and of institutional physical culture in particular in the industrial workers' use of leisure and physical activity. The use of time and physical activity were studied quantitatively and qualitatively as well as their relations. Information about the frequency of participation in different forms of physical activity, involvement in organized sport and motivation for sport and physical activity as well as social background, health and work were collected by means of structured questionnaire, which was given to a stratified sample of 1640 subjects with the return of 82 percentages. In the second phase, 902 subjects were selected from the original population by stratified sampling, and they were studied individually in a sociological and medical investigation and interviewed about their physical activity during leisure time. Moreover, the subjects filled in a time budget diary during four days at home after being instructed as a group how to do it. The results indicate that institutional sport and physical activity have little significance for people's physical activity when compared with other kinds of moving and necessary home chores. The use of leisure and sports-like physical activity seems to be connected with people's total use of time, type of work, socioeconomic status and sex.

Kirjonen. Juhani. Sport and physical capacity for work. - The purpose was to describe what kind of differences can be found in health, particularly in functional capacity, of people engaged in various stages of production. Health examination was carried out in spring 1973. The sample of male subjects consisted of 609 persons. The data were com-

piled by questionnaire and interviews. Measurements of health and physical fitness were also made. This preliminary report gives a description of how the expenditure of time of various groups of employees is distributed and what is the proportion of work and physical activity out of the total time spent. The health status is described by examining functional capacity and socially significant morbidity. The relations of amount of physical activity and age and occupational status are studied and also the health status of workers and clerical personnel as influenced by the amount of their physical activity.

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METELI. Terveystutkimus: otanta, menetelmät ja toteuttaminen.
[METELI. Health examination: sampling, methods and implementation.]
Jyväskylä 1975. 279 p. Reports of Physical Culture and Health 9.

Planning, methods, data and implementation of health examination, which is one of the principal sectors of the METELI research project, are discussed in the report. The health examination was carried out as a cross-section study, and it comprised a sample of about 300 women and 600 men representative of occupational groups working in three machine industry plants. The text proper is augmented with an appendix section including all questionnaires used, list of variables and their distributions, etc. The report does not include the actual results of the examination, which are to be published separately. The report is best suited for use as curriculum material in the teaching of research methodology at university level.

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METELI. Terveystutkimuksen mittausohjeisto.
[METELI. Measurement guide of the health examination.]
Jyväskylä 1975. 70 p. Reports of Physical Culture and Health 10.

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METELI. Kolmen metallitehtaan henkilöstöjen liikuntakäyttäytyminen.
[METELI. Leisure time sport and physical activity of employees in three plants of the machine industry.]
Jyväskylä 1975. 275 p. Reports of Physical Culture and Health 11.

The purpose of this study was to examine the role that physical activity plays quantitatively and qualitatively in the life of employees and to analyze this activity from the viewpoint of leisure interests and other kinds of social involvement, use of time, living conditions, and health. This behavior has been comprehended to comprise all goal-oriented physical activity like physical activity required at work, in home chores, physical activity in traffic and interest in physical activity. Also involvement in sport through individual participation belongs to this behavior. In this report physically active behavior outside the work-situation is studied. Physical activities are divided into physical activity required in industrial production and industrially non-productive leisure time sport and physical activity.As to physical activity in production, participation in and attitudes to non-work physical activity in one's workplace and during commuting are studied. Leisure time physical activity is further divided into organized and non-organized activity. Motivation and use of sport services are described in this connection. Regarding organized sport involvement in sport and consumption of sport are described. The former comprises affiliation to competitive sport organization or choice of organization, participation in club activities, interest in competitive

sport, a.o. - and the latter attending competitive sport events as spectator or following events in mass media. The results describing the role of sport and physical activity are discussed in relation to sex, age, specialfeatures of work, background of former socialization, one's class status and status in the social stratification and general living conditions. Also the relations between different contributing factors are analysed.

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METELI. Ammattiasema, työolot ja sairastavuus metalliteollisuuden henkilöstöryhmissä.
[METELI. Occupational position, working conditions and morbidity among employees of macnine industry.]
Jyväskylä 1977. 195 p. Reports of Physical Culture and Health 18.

The aim of this part of the METELI research program was to find out the differences in morbidity among the employees of machine industry according to occupational status, age and sex groups and the connections between certain specific aspects of working conditions and morbidity. Special attention was paid to the occurrence of diseases and symptoms in the locomotor system and stress symptoms (psychological and psychosomatic symptoms), because they can be considered to reflect occupational health problems typical of semiautomated technology. The population of the study comprised a sample of 902 persons. Collection of data was carried out extensively so that questionnaires, interviews, clinical examination and physiological measurements completed each other.
The position in the production process and the specific aspects of working conditions were clearly reflected in the status of health of the examined population. The lowest morbidity occurred among the managerial staff, it was higher among the clerical staff and skilled workers and highest in the group of semiskilled workers. In the employee groups of the highest morbidity, locomotor diseases, psychosomatic stress symptoms and other diseases as well as temporary disability, chronic diseases and premature retirement were common. Stress symptoms were most common with those whose jobs were most force paced and least interesting and in whose working environments the various harmful physical and chemical effects were most plentiful. The most degenerated condition of locomotor system was with the workers whose job characteristics, according to the ergonomic observations carried out at work places, were most loading.
The prevalent tendency is to change the focus of public health care into the direction of preventive health care, because the most common diseases can only to a limited extent be cured by therapeutic medical science. As many of the factors directly connected with morbidity are to be found in working conditions, more attention should be paid to labour protection. It should be seen in a wider context as an essential form of public health activities aimed at the working population.

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* Socialization into Sport Involvement

LAAKSO, LAURI, Jyväskyläläisten nuorten aikuisten liikuntaharrastukset.
[Leisure time sport activities of young adults in Jyväskylä.]
Jyväskylä 1976. 63 p. Reports of Physical Culture and Health 16.

This report is the first part of a large research project the purpose of which is to explain leisure time sport activities at adulthood with help of variables describing childhood and youth. The purpose of this part was to describe leisure time sport activities and their development from childhood to adulthood in the group of young adults. A random sample of 300 was drawn from a population between ages 26 and 32 living in the town of Jyväskylä. In the first stage, they were asked about their sport activities by means of mailed questionnaire and in the second stage they were interviewed personnally. The results indicated that 62% of the subjects had participated in sport during the last 12 months and 34% had participated at least twice a week. Fourteen per cent of the subjects were members of a sport club and 5% of them had participated in competitions. Walking, cross-country skiing and swimming were the most popular activities. In women's group, the sport activities were best explained by below-school-age children and in men's group by the duration of residence in the dwelling place.

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* Top Athletics as a Content of Life

VUOLLE, PAULI, Suomalaisen huippu-urheilijan elämänura.
[Life-career of Finnish top-level athlete.]
Jyväskylä 1976. 128 p. appendices.
Reports of Physical Culture and Health 17.

The report presents research findings on Finnish top-athletes' social background, occupational, educational and social status and the making of sports career and factors affecting its development. The population of the study was the most successful male athletes during the Olympic years from 1956 to 1972. They represented 21 sport disciplines. They were divided into representatives of team sport and individual sport as well as active athletes and those who had finnished their sport career at the time of the mail inquiries (1972/1973).
Top-athletes' educational level and occupational status have, on the average, been higher and association activity generally more common than in the male population of respective age groups in the whole countdy. This can be considered to follow from at least three facts. 1) Compared to the average population athletes come more often from urban settings where educational, occupational and social participation is more easier than in the countryside. 2) Socioeconomic status of athletes' childhood home, which affects the objects under scrutiny, is to some extent higher than that of the non-athlete control group.
3) Athletes consider that sport has promoted occupational career, both its onset and development. Although the majority of athletes thinks that sport has supported their occupational advancement, it is generally regarded as inhibiting attending school and studying. In addition to this, sport has been seen to demand sacrifices in such areas of personal life which are close to everybody (e.g. personal freedom and holidays). But on those fields of life where need for participation is recognized rather vaguely (e.g. cultural life), sacrifices for sport have

been experienced to a rather small extent. Different sport disciplines show differences in respondents' social background, education and occupational status. Disciplines reflect various social factors affecting various events. The divergencies show up in recruiting athletes to different disciplines from distinct social strata. This very consecutive finding indicates that there is constancy in the development of athletes' social status when recruitment base of representatives of certain discipline is the same.

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VUOLLE, PAULI, Sport as life content of successfull Finnish Amateur Athletes. Jyväskylä 1978. 33 p.
Reports of Physical Culture and Health 21.

The report presents research findings on Finnish male top athletes' education, occupation and family life in the span of life, time expenditure during active sport career, and their relations with sport career. The frame of reference is Festinger's theory of dissonance. The population was the most successful athletes in the Olympic years from 1956 to 1972. The results are based on surveys from 1972 and 1975.
Top athletes' educational level and occupational status have on the average been higher than in Finnish male population of respective age in general. Athletes consider that sport has restricted educational advancement more than occupational career. Sport has been regarded as demanding sacrifices in personal life. In the fields under scrutiny, there were differences between the beginning years, top period and retiring phase to some extent, but no marked differences could be shown between the different years. Changes were shown between individual and team athletes as well as the active and retired. The report summarizes the author's dissertation Urheilu elämänsisältönä. Menestyneiden urheilijoiden elämänura kilpailuvuosina [Top sport as content of life. Life career of successful athletes during active competitive period] - (Jyväskylä 1977). The dissertation and its supplementary report Suomalaisen huippu-urheilijan elämänura [Life career of Finnish top athletes] - (Jyväskylä 1976) focus on sport career of Finnish top athletes. The reports belong to the international research project initiated by the International Committee for Sport Sociology in 1969.

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* YEAR BOOK

Research Institute of Physical Culture and Health. Year Book 1977.
Ed. T. Haajanen, Information Service.
Jyväskylä 1978. 146 p. Reports of Physical Culture and Health 20.

Includes the following papers by the researchers at international congresses in 1977: Siren-Tiusanen, H. The meaning of physically active play and movement games in preschool physical education; Silvennoinen, M. Comprehensive school pupils' motivation for sport and physical activity; Telama, R. Pupils' interest and motivation for sport in Finland; Kiviaho, P. Physical activity of the Finnish adult population; Lahtinen, U. Physical fitness and psychomotor performance of mentally retarded children; Vuolle, P. Influence of mass media on people's sport behavior in Finland; Telama, R. The relationship between leisure time physical activity, physical fitness and health among employees of machine industry in Finland; Laakso, L. Some aspects of social and regional background of Finnish top-level track and field athletes and baseball players; Vuolle, P. Top sport as content of life; Haajanen, T. & Veistola, M. Instruction in the use of information sources: Faculty of Physical Education.

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Research Institute of Physical Culture and Health. Year Book 1978.
Ed. T. Haajanen, Information Service
Jyväskylä 1979. 94 p. Reports of Physical Culture and Health 24.

Includes the following papers by the researchers at international congresses in 1978: Silvennoinen, M. On the principles of developing and comparing objective and content structures in physical education with special reference to the Finnish comprehensive school curriculum; Laakso, L. & Häkkinen, K. On the relation of physical education students' time use to changes in their motives for career choice; Laakso, L. & Telama, R. Sport activities of Finnish youth with special reference to young school leavers; Laakso, L. Social mobility of Finnish elite-athletes of different achievement level; Kiviaho, Pekka & Mäkelä, Pekka, Olympic success: the influence of non-material and material factors; Vuolle, P. History of sport finances in Finland and other Scandinavian countries. The previous papers are by the personnel of the Research Institute of Physical Culture and Health. The Research Unit for Sport and Physical Fitness contributes with the article by Vainikka, M. & Rahkila, P. Physical fitness of young Finnish men.
The year books start with current presentation of the scientific work and close with abstracts on reports in the series Reports of Physical Culture and Health.

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* Information Service

HAAJANEN, TIMO & SIKANEN, RAIJA, Bibliography on physical activity and sport behavior.
Jyväskylä 1975. 58 p. Reports of Physical Culture and Health 6.

The concept of physical activity and sport is defined from the viewpoint of behavioral sciences to mean active participation in and attitudes to leisure time physical activity and sport and involvement in and consumption of sport.

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HAAJANEN, TIMO & VÄKIPARTA [VEISTOLA], MAARET, Evaluation in physical education: a selected bibliography.
Jyväskylä 1976. 70 p. Reports of Physical Culture and Health 15.

The bibliography has been constructed according to the themes of the International Congress of Physical Education "Evaluation" (FIEP, Jyväskylä, 28.6.-3.7.1976). The references cover some to general motor tests and to anthropometric measures of children at school age, in addition to references to school physical education. The material concerns only normal, non-retarded children; competitive sport as well as medical effects of school physical education are excluded.

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HAAJANEN, TIMO & VEISTOLA, MAARET, Bibliography of school physical education: current references.
Jyväskylä 1978. 79 p. Reports of Physical Culture and Health 22.

The present bibliography has been compiled for a symposium on school physical education, held at Pajulahti Sports College, June 8-9, 1978. The symposium was organized for reports of current research projects in Finland. The Finnish and foreign references comprise, however, also other than research originals.

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